WATER RESCUE OPERATIONS

SAN FRANCISCO FIRE DEPARTMENT

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Water Rescue Operations
January 2008

San Francisco Fire Department
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FOREWORD

The goal of this manual is to establish standard operating practices as authorized by the Chief of Department and implemented by the Division of Training.

The purpose of this manual is to provide all members with the essential information necessary to fulfill the duties of their positions, and to provide a standard text whereby company officers can:

- Enforce standard drill guidelines authorized as a basis of operation for all companies.
- Align company drills to standards as adopted by the Division of Training.
- Maintain a high degree of proficiency, both personally and among their subordinates.

All manuals shall be kept up to date so that all officers may use the material contained in the various manuals to meet the requirements of their responsibility.

Conditions will develop in fire fighting situations where standard methods of operation will not be applicable. Therefore, nothing contained in these manuals shall be interpreted as an obstacle to the experience, initiative, and ingenuity of officers in overcoming the complexities that exist under actual fire ground conditions.

To maintain the intent of standard guidelines and practices, no correction, modification, expansion, or other revision of this manual shall be made unless authorized by the Chief of Department. Suggestions for correction, modification or expansion of this manual shall be submitted to the Division of Training. Suggestions will be given due consideration, and if adopted, notice of their adoption and copies of the changes made will be made available to all members by the Division of Training.

Joanne Hayes-White
Chief of Department

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SECTION 1. HISTORY AND BACKGROUND

Historically, the San Francisco Recreation and Parks Department staffed full and part time lifeguards at Fleishackers Pool at Sloat and Great Highway. Part of their duty was to respond to Ocean Beach for Surf rescues incidents. Fleishackers closed in 1971 when a pipeline feeding salt water to the pool suffered insurmountable damage due to storm surf. Attempts were made to fill the pool from the domestic water supply, but because of the size, it could not be chemically treated and was subsequently closed. The City also staffed the facility at Phelan (also known as China Beach) with two lifeguards and one/two lifeguards at Aquatic Park.

In 1972, the Golden Gate National Recreational Area (GGNRA) was established and all the water perimeter area came under their jurisdiction. Under an agreement, the San Francisco Recreation and Parks Department maintained their facilities until 1977. At that point in time, the GGNRA staffed the facility at China Beach and Aquatic Park with three full time lifeguards. Part of their duties was to respond to Ocean Beach for water rescue incidents. They were fully equipped with two inflatable boat rubber boats, wet suits, first aid equipment etc. Budgetary cutbacks took its toll and the facility was left equipped but unstaffed in 1989. The lifeguards were absorbed into the system and given tasks for the Park Service in the GGNRA but would still monitor communications for water or cliff rescue incidents when on duty.

The San Francisco Fire Department had always responded to cliff rescues from Station 14, and in 1972 Station 14 was assigned a specialized 4x4 vehicle in which to respond. In order to ensure a quick reaction time, it was relocated to Station 34 where it is quartered and equipped with both climbing and surf rescue equipment.

In 1986, a core group of Fire Department members established the Surf Rescue Team. Wet suits, rescue tubes, fins, and short rescue boards were purchased and carried on Truck 18. As other agencies relinquished their staff and ability to respond to water rescue incidents, the San Francisco Fire Department began to take on a broader water rescue responsibility. Volunteers were encouraged and the team was expanded. In 1989, Station 18 was assigned a pick-up truck (Surf Rescue 18) which was outfitted and used as a special response vehicle. Station 14, 23, and 19 were also issued water rescue equipment.

As the program expanded in both numbers and importance, the Mayor's office, in 1990, granted the Fire Department the funds to purchase two trucks dedicated to surf and cliff rescues. Ford F-150 were purchased and equipped. The 'Cliff Rescue' truck is stationed at Station 34 and the 'Surf Rescue' truck is stationed at Station 18. Both are equipped with cliff and surf rescue equipment.

Members of the Team were instructed and evaluated on lifesaving techniques, based on the United States Red Cross Standards for Lifeguards, and additional instruction and training in the various facets surrounding surf/ocean rescues. In 1991, statistics indicated that there were more fatalities in water related incidents than fires in San Francisco. This statistic reinforces the need for maintaining a professional Surf Rescue Team which can effectively meet the public safety demands. Another alarming statistic states that all non-water trained public safety professional attempting a water rescue has a 33% chance of drowning them selves. These statistics reinforce the need for continued quality instruction and training. The commitment of the Department to maintaining this unit demands constant training, evaluation and revision of operational procedures as warranted.

In 1996, the Fire Department adopted the standards set forth by the United States Lifesaving Association (USLA) for training and recertification. Subsequently, the USLA certified the San Francisco Fire Department as an Aquatic Rescue Response Team (ARRT). This was the first non-lifeguard agency in the United States to get this certification.

SECTION 2. OVERVIEW OF SURF RESCUE

The following is an overview of a typical surf rescue incident and what firefighters must consider when responding. It is difficult to set down hard and fast rules that can be utilized due to the vast amount of variables that ocean and weather conditions presents. The nature of firefighters' duties often calls for use of ingenuity, adaptability, and common sense, based on training. If called upon, you will discover that this is no more apparent than in a surf rescue.

The following are examples of considerations in typical incident. These considerations have evolved and are based on actual rescues. The Fire Department, including EMS, will be responding as one of several agencies to a surf or cliff rescue incident. Other agencies that can become involved are:

- Golden Gate National Recreational Area (GGNRA) Beach Patrol
- United States Park Police & (GGNRA) Park Rangers
- United States Coast Guard Helicopter and/or Rescue Vessels
- EMS Ambulance Service.
- Presidio Fire Department will respond, should the incident occur in the Presidio.

Although jurisdiction will usually fall under the GGNRA, we have not encountered jurisdictional problems when running a rescue.

When an alarm is dispatched, the first consideration is the origin of the call. If Park Police or GGNRA Park Rangers receive the call, they may be on the scene and have a location pinpointed. If the Department of Emergency Communications (DEC) receives the call, it is a good idea to locate the reporting party, as he or she can reveal a wealth of precise information.

Time is the most critical factor! When the location is determined, a command post shall be established in a location that will afford a visual overview of the situation. Incoming companies will be updated via radio, on the Tac Channel, as to the best route and location for staging equipment and personnel resources. The regularly assigned units carry accurate maps of the ocean and cliff areas in their inventory.

The normal assignment to a surf and/or cliff rescue incident is:

Surf Rescue 18 (Station 18)
Engine 34
Cliff Rescue 34 (Station 34)
Truck 18
Rescue Squad (RS1 or RS2)
First-Due Engine
First-Due Truck
Battalion Chief (Batt 7 or Batt 8).
Rescue Boat/Fireboat St. 35 (in Bay)
Rescue Watercraft St. 16 (in Bay)

As an example of a surf rescue incident, assume that the Communications Center receives the report of a person in trouble at Ocean Beach. The Cliff Rescue Unit, a four wheel drive vehicle, will respond onto the beach where possible. The Surf Rescue 18 vehicle will try to establish a position of reference by driving in-line, on the road, with the Cliff Rescue unit (on the hardpack sand of the beach) and the victim. (If the rescuers lose visual contact with a victim while swimming out, they can use the two vehicles as a tangent.) The aerial ladder should be raised as a spotting platform with the tiller operator equipped with a pair of binoculars, signal flags, and portable radio on the tac channel. A Beach Division or Rescue Group will be established and will ascertain all pertinent information about the incident and relay it to the Incident Commander above the beach.

Water Rescue Team members, in wet suits and with rescue equipment, shall be deployed in teams of two. When possible, deployment of more than one team is advisable due to the different tidal effects. The victim may drift laterally and a second team can enter ahead of the victim. Firefighters on the scene can assist with the needs of the initial rescue team, whether it be spotting the victim, transporting rescue equipment, assisting the rescuers with needed equipment, or first aid equipment to the appropriate location.

When possible, the rescuers will take the victims beyond the surf zone and maintain a position until the USCG or GGNRA inflatable boat arrives on scene to transport. GGNRA will transport a victim to China (Phelan) Beach. EMS will be directed to rendezvous at China Beach. USCG will transport to Station Golden Gate on the Marin Headlands and will arrange victim transport to Marin General Hospital Emergency Room. It has proven safer to evacuate in this manner rather than to swim a victim back to shore. When possible, the rescuers should also return to land via RWC or boat.

**EMS protocol should be confirmed/updated.

Assume the drowning victim has suffered head and neck trauma. Always insure that C-spine precautions are followed. A near drowning victim may have ingested salt water so, he or she should always be treated by the EMS ambulance crew. Keep in mind that it is possible the victim may have been subject to hypothermia. **Do not use the Defibrillator!** Due to the cold temperature of the water, the victim may be suffering from bradycardia and apnea (slow or non-discernible respiration and heart beat). CPR should be initiated as soon as possible.

According to statistics, most drownings will occur late in the day which will usually prolong the rescue attempt into darkness. The USCG helicopter is equipped with a high intensity light for night rescues, and air crews are equipped with night vision devices. Additionally, the Surf and the Cliff Rescue Units have 12 volt, portable one million candlepower spotlights for shore use.

Depending on a combination of factors (clothing, age, physical conditioning, body fat content, diet etc.) the drowning victim can be positively (surface) or negatively (below surface) buoyant. If the USCG helicopter spots a victim just below the surface of the water, they will direct rescuers to the location. Whenever the helicopter remains on scene, so should rescuers. If one victim has been spotted and rescuers deployed, don't overlook the fact that there may be other victims in the water. On one occasion, a person on the beach saw a victim in trouble, attempted a rescue, and became a fatality in the process. The initial report indicated that there was only one victim. In reality, rescuers were faced with a double rescue attempt.

Many cliff rescues have evolved into a combination cliff/surf rescue. Several rescues in the past involved moving victim(s) off the cliffs to a beach and rescue slinged into the USCG helicopter, or taken from the beach by GGNRA inflatable boat. In past incidents, victims either have fallen or were being evacuated from a beach during an incoming tide necessitating loading the victim into the USCG helicopter rescue basket while standing in waist high water. The Surf Rescue team members should stand by, suited up and equipped, ready to assist if needed.

Safety First is the main consideration at all surf rescue incidents. You do not want to compound a single-person rescue into a multi-victim rescue by having a rescuer getting into trouble. **The greatest insurance for a safe operation is based on prior training and actual ocean drills. The more water time equates to a more confident and effective rescuers.**

SECTION 3. EQUIPMENT

This section will describe the equipment used by the Water Rescue Team members. It is recommended that all members of the Department familiarize themselves with this equipment. You may be called upon, under an emergency situation, to quickly make ready this equipment for use. How well you perform this task under pressure may be the element that contributes to the success or failure of the rescue. Units wishing a surf or cliff rescue orientation may make arrangements through the Division of Training.

WET SUITS

Because of the frigate ambient temperature of the water surrounding the City of San Francisco, no rescuer should enter the water without the use of a wetsuit. Even for short periods of time, your effectiveness will be greatly diminished because of the physiological effect of the cold water on the human body.

We employ two styles of wetsuits. The Rescue Squads use a heavier thickness of suit for underwater diving operations. For use in the surf, where flexibility is necessary for surface swimming, a thinner suit is used. Surf rescue suits are constructed of two thicknesses of rubber. The body of the suit is made of 4mm rubber with 3mm used for the arms and legs. There is a slight tradeoff that the body will lose some heat through the thinner material, but, these suits have proven totally suitable for our ocean rescue use.

The suits are kept in equipment bags along with the fin socks (booties), fins, hood, and rescue tube. The bags, as well as all the equipment has been labeled in large letters for size as well as the unit of origin. All wetsuits shall be rinsed after pool or ocean use. Salt and chlorinated water are detrimental to the composition of the suit. Wet suits shall not be dried in direct sunlight as ozone will deteriorate the material.

FINS

The Water Rescue Team members will be using surf fins when entering the water. These fins are made specifically for use in the surf and are smaller and more flexible than the version used for SCUBA diving. Along with the wet suit and rescue buoy, fins are one of the most important pieces of equipment, to be used by a rescuer. White water or foam, the byproduct of the wave action, consists of fifty percent air. In order to swim through this, a person without fins is at definite disadvantage. Fins will allow the rescuer added speed when approaching the victim and kicking power when swimming with the victim in tow.

RESCUE BUOY/PETERSON

As emphasized in various parts of the manual, the use of these rescue tools shall be mandatory. Not only can they be considered as a rescue tool, but also a flotation device. It is red in color and is constructed with an attached integrated shoulder strap and leader rope.

The rescue bouy constructed of a soft, flexible, neoprene rubber with a strap and metal hook integrated into it. This device can be used in a wider variety of circumstances. It shall be considered the primary choice in rescue tools. The main advantage of the rescue tube over the rescue buoy is that it can be bent and strapped securely around a victim. It can be adapted for use with both conscious and unconscious victims, self rescue, and as a flotation (resting) device. It's adaptability allows it to be secured around victims of different physical stature.

PORTABLE GENERATORS AND SEARCH LIGHTS

For low light condition rescues, the Surf and the Cliff Rescue Units carry generators and lights. They are the same type carried on truck companies. If there is a rescue attempt at night, one thing that should not be overlooked, is that all members shall take a flashlight before leaving the apparatus. Should it become necessary to survey a route in the dark, personnel light is essential. Consider that the Cliff Rescue vehicle is a four-wheel drive vehicle that can access many areas, has a generator/lights system in it's inventory, and may be an easier alternative than carrying a generator to a remote location.

RESCUE LINE AND THROW BAGS (USE ONLY IN LAKE MERCED)

Carried on the Surf Rescue and Cliff Rescue units are 500 foot spools of 1/4" polypropylene rope. They are mounted on a board that is set up with a shoulder harness. When deployed, the rope system will be attached to a rescuer's tube or buoy and fed out as the rescuer swims to the victim.

A Firefighter feeding the rope out should take a position near the edge of the water in order to alleviate drag on the rescuer. Once attached to the victim, the rescuer will signal the firefighters on the beach who will begin to pull in the rescuer/victim It is important that you be aware that the rescuer will signal as to when to pull and when to slack off on the rope.

Throw bags are carried on the Surf and Cliff Rescue Units and are 100 feet in length. Inside the bag and secured to the end of the rope is a small rubber float. If the victim is close enough to the shore and conscious, this floatable bag can be thrown like a ring buoy. One of the first laws of water rescue is the REACH, THROW, and then GO. Following this rule will subject the rescuer to less danger.

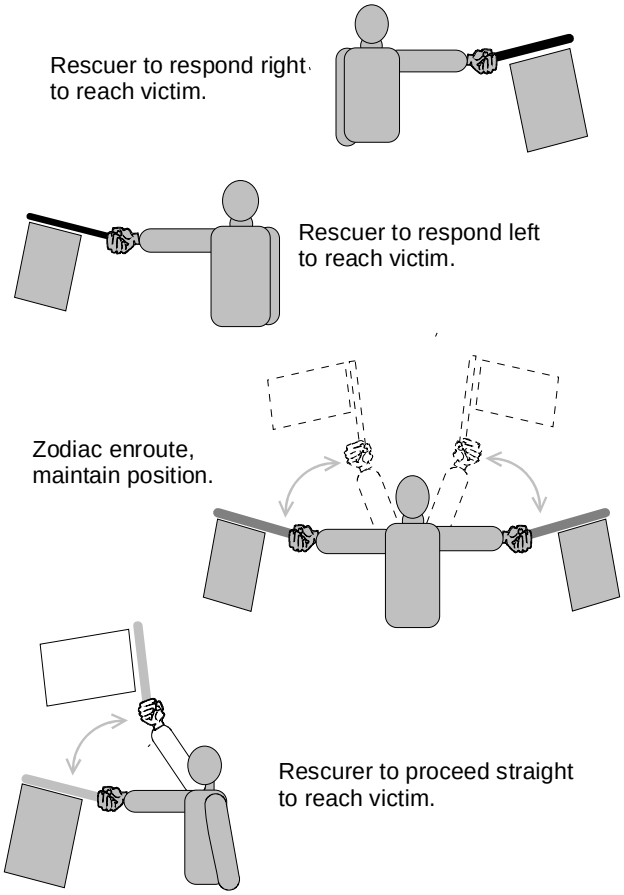
SHORT BOARD (BOOGIE BOARD) AND RESCUE BOARD

Depending upon the conditions, the water rescuer may determine that it is advantageous to respond to a victim using a rescue board. The short board, a common over-the-counter Boogie board, is made of a soft pliable, buoyant compound. Approximately four feet in length, the Boogie board will allow the rescuer a rapid response when used in conjunction with a set of surf fins. When the initial team of two rescuers proceeds toward a victim, one can respond with the board and the other with the rescue Peterson. If conditions are such that the rescuer with the board reaches the victim first, he/she can utilize the board for victim floatation until the rescuer arrives with the buoy.

The, (the new boards are 12') Rescue Board, will probably be a better choice if the victim is further out in the water or there is little to no surf. An inexperienced person on this board will have a difficult time getting through the surf. However, the time lost going through the surf line with a Rescue Board may be made up once beyond the area of wave break. The Rescue Board will probably not be used by the initial rescuers but a subsequent follow-up team. The board is constructed of the same material as are the Boogie boards and is approximately eight plus feet in length. It is buoyant and stable enough, with the help of the rescuer, to have the victim climb onto it and wait for additional support to arrive.

SECTION 4. IDEAL RESCUE CONDITIONS

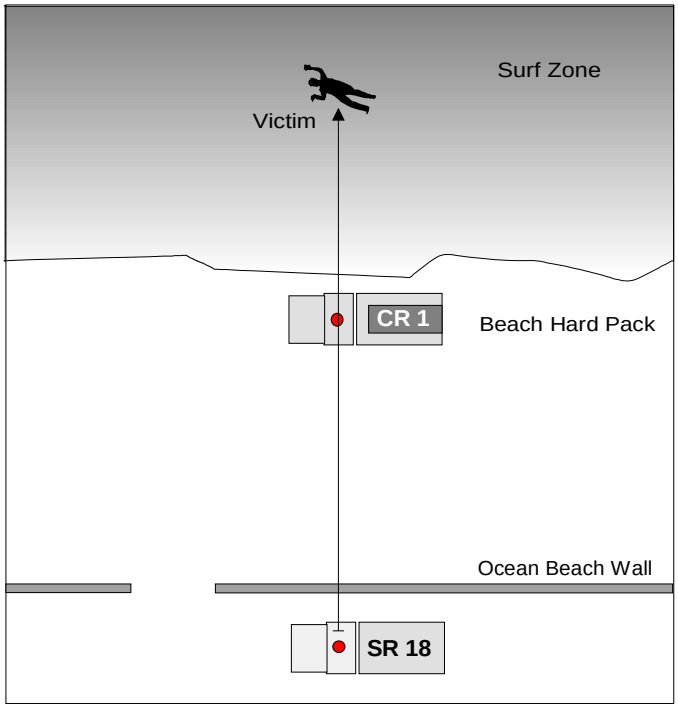
This section deals with the aspects of a water rescue operation that are considered key for success. As stated in the overview, the first priority of the rescue is the location of the victim and the deployment of the initial rescue team.



Once visual contact is made with a victim in the water, every effort shall be made to maintain that contact. Once the location of the victim(s) is established, the first truck company on the scene shall raise it's aerial ladder for use as a spotting platform. This will provide an elevated vantage point to observe the movement of the victim and rescuers, the tiller person shall take a pair of binoculars and signal flags to the top of the aerial. From this vantage point, the tiller person can relay information via the speaker system to another member who can use the vehicle radio to update the Incident Commander and the Rescue Group Supervisor. If available, the aerial spotter may use a portable radio on the Tactical Channel and talk directly to the Rescue Group Supervisor. It is essential that this observer consider the possibility that there may be more than one victim in the water.

While in the ocean swells, it is very likely that the rescuers will lose visual contact with a victim. Should this occur, the rescuer can look back to the beach for an indication of the direction in which to proceed. Two methods will aid the rescuer(s). First, the Surf Rescue and the Cliff Rescue units both carry red signal flags which can be used to indicate to the rescuers the relative location of the victim to their position. Flags shall be given to the tiller person who can display them appropriately for the given situation. Trucks 14, 16, 18, and 19 have signal flags in their inventory.

When possible, the Surf Rescue Unit and the Cliff Rescue Unit should align themselves in a tangent with the victim. The rescuer can observe this and intersect the tangent and then be in-line with the victim. Both vehicles are equipped with strobe lights which will make them visible and become easily recognizable to the rescuers. If this technique is used, it is helpful for all other vehicles to turn off their red emergency lights.



When the Fire Department receives a dispatch, the Communication Center will notify the United States Coast Guard and the Golden Gate National Recreation Area. The Coast Guard will dispatch their rescue vessels from Station Golden Gate (located on the Marin side of the Golden Gate anchorage at Horseshoe Cove). They will respond with their 25' Response Vessel or 47 foot surf boat. The GGNRA has three inflatable boats (one ready to go at all times) at their facility at China Beach. Because of staffing shortages, the SFFD may be called upon to assist them in the launching and staffing of their inflatable boat.

An Engine company may be dispatched to the China Beach facility. Responding members of that Engine company shall don wet suits in preparation prior to arrival.

Firefighters may be requested to respond and assist the Park Service personnel on the inflatable boat. The Park Service realizes that they may be accompanied by members of our Department who are untrained or lack experienced in the use of small boats. They will make available the appropriate safety equipment, flotation jackets, helmets, etc., and issue instructions prior to departing. Members on board shall take directions from the Park Service Rangers and assist as needed.

When at all possible, victims and rescuers shall be evacuated by small boat. This is the best alternative, thus avoiding swimming a victim back through the breaker line, and subjecting the rescuer/victim to additional danger. The Fire Department and the Coast Guard will see to it that the rescuers are returned to their Station(s) as soon as is feasible.

It is possible that an inflatable boat is not responding and the rescuers will have to swim back to the beach with the victim. THIS IS THE MOST DANGEROUS RESCUE OPTION. Units deployed on shore must be prepared to provide maximum support to this type of rescue.

SECTION 5. RESCUE TECHNIQUES

Professional lifeguard associations state that their main goal is to prevent situations requiring rescues by enforcement and education. Due to the nature the Fire Department's response, units will be receiving the dispatch after the fact. By the time the Fire Department arrives on the scene, the incident is usually in the critical stages and the element of risk has already begun to escalate. The goal of the Water Rescue Team is to counter the unpredictability of drownings through training, knowledge, skill, and simulated rescue practice.

When the alarm for a surf rescue is dispatched, it is important that all water rescuers of the responding units begin to don wet suits as soon as possible, preferably before leaving the station. Lay out fins, fin socks, rescue tube etc., for the other rescuers so that they will be able to grab them and deploy immediately upon arrival.

When arriving on scene and upon establishing visual contact with the victim, it is imperative that firefighters maintain contact with the victim throughout the event. A spotter should be assigned at once and utilize binoculars carried on Surf Rescue 18, Cliff Rescue 1 and truck companies.

Remove all swimmers from the water. The use of whistles and hand motions will effectively signal swimmers to shore. By removing others from the water will make it easier to focus on the victim needing assistance and minimize confusion during the rescue. Bystanders will be temped to assist in the rescue. However, if they enter the water, they will most likely become a hazard. Get them out of the water and keep them out! If the SFPD, US Park Police, or GGNRA Park Rangers are not directly involved in the rescue, this is an important task for them.

If on soft sand, the rescuer, with the proper equipment, shall run straight to the hardpack sand, then laterally toward the victim. This is important for two reasons. First, this is a quicker method than running diagonal over a greater distance on softer (slower) sand. Second, while watching the victim, you can also evaluate the ocean conditions for lateral currents, rip tides, wave formations, and other hazards. During drills, simulated victims have drifted up to 300 yards from the spot they entered the water. Strong lateral currents are usually between the beach and the wave sets (Surf Zone). Depending upon the size-up, you may determine that it is advantageous to enter the water ahead of a victim caught in a lateral current or to make use of a nearby rip current to rapidly swim through the breaker line.

Depending upon the size of the waves, different techniques can be used to advantage. If the waves are large, it is better to dive under the wave and surface behind it. When in shallow water, the rescuer can dive to the bottom, dig his hands into the sand, and spring off the bottom when the wave has passed. On smaller waves, the rescuer can go over the top. While doing this, it will allow time to make visual contact with the victim and evaluate the incoming wave conditions. Swim high in the water and, if necessary,

do a "push up" on the rescue flotation device in order to maintain visual contact with the victim.

It is important that rescuers not expend all their energy reaching the victim. If possible, use alternate rescue strokes (heads-up-crawl, breast stroke, etc.), thus utilizing different muscle groups. You will be less fatigued and more effective when reaching the victim. The rescuer shall evaluate the following variables in order to establish the rescue technique to be used.

- Condition of the victim (active, passive)
- Size of the waves and strength of currents
- Size of the victim
- Distance from shore
- Whether a inflatable boat or helicopter is enroute

When observing a swimmer having difficulty, the rescuer will notice one or more indicators of distress.

- Victim's head will be low in the water
- Victim will be struggling, with arms flailing in the air
- Victim will be gasping for air
- Waves constantly breaking over the victim's head
- Slow stroke, vertical body position, absence of kick
- Swimming against a rip tide and not advancing

Upon reaching a struggling victim, observe the victim’s eyes. Eyes that a wide open and fixed are good indicators of fright or panic. The rescuer must decide on the most appropriate technique for the rescue. Reassure the victim(s) and have them agree and repeat the instructions you have given them as to what you will be doing. If the person is panicking, you will represent an island to them. Their natural urge will be to attempt to climb to safety on top of you. They will be experiencing an adrenaline rush and have super human strength on their side. Your advantage is your training. By using proper technique you can avoid being taken under.

When confronted with a situation like this, one alternative is to use the victim's strength to your advantage. If you are not contending with any outside hazards (proximity to rocks etc.) remain between the victim and the beach, maintain a position that is a safe distance away from the victim’s reach, and then backpedal toward the beach. This will serve a dual purpose. As the victim attempts to reach out toward you, they will be moving back toward the beach and they will also be tiring themselves out. As they reach a state of exhaustion, they will become docile and it will take less of the rescuer's strength to manage them.

As the rescuer approaches the victim, the rescuer, without looking behind, shall pull the rescue tube up to him/her. Pull off the shoulder strap before advancing the tube to the

victim. Should the victim panic and pull against the tube/rope, the rescuer is detached, and will allow the rescuer to back away and regroup.

After the rescuer has secured the victim in the tube, the rescuer shall calm the victim by explaining that the victims help is needed in kicking back to the beach or that a small boat will pick them up. Occupying the victim will alleviate some of their fear. It will also aid in placing their body in a horizontal position which will become advantageous while swimming them back to the beach if necessary. The rescuer shall always give positive verbal reinforcement to the victim during the rescue.
An unconscious victim floating on the surface presents the rescuer less of a problem with the rescue but other important considerations come into play. You will be unaware of the injuries that the victim has suffered. It is important to assume that there might be back, head, or neck injuries. Special handling shall be considered when evacuating the victim from the water either into the boat, helicopter sling or onto the shore.

Under ideal circumstances, two Water Rescue Team members should deploy together and at least one shall respond with a rescue tube. The rescue tube offers the rescuer more flexibility than any other device because it can be used in the following manner:

- On a conscious victim
- Secured around an unconscious victim
- Used for self-rescue
- For support (as a resting device)
- For support (higher in the water for visual victim spotting)

The other rescuer can choose between a rescue tube or boogie board. If conditions are such that a Boogie board will aid in the rescuer in a quicker response to the victim, then that would be the logical choice for the second rescuer. The rescuer on the board can quickly reach and stabilize the victim until the second rescuer arrives with the rescue tube. **No rescuer should ever attempt a rescue without a rescue device.** All our rescue flotation devices can also be used for self rescue, should the situation arise.

It may occur that there is only one rescuer on the scene (while other Companies are still en-route). Since the rescuer will not have a built-in margin of safety afforded by a two-member rescue, careful evaluation shall be made before proceeding with the rescue. Again, the rescue tube shall be used. The firefighters on the beach will constitute the safety backup should there be trouble. They can pull the rescuer back to the beach rapidly. There is a possibility that a Rescue Team member may be attempting a rescue alone or will have reached the victim(s) ahead of his partner. This procedure is not considered optimal in regards to effectiveness or rescuer/victim safety.

Should the rescuer be confronted with a multi-victim rescue, the rescuer should give his priority to the victim in the most life threatening condition. If one victim is unconscious and the other victim active, snap on or hand the active victim the flotation device and proceed to the other victim. A cross chest carry can be used for the second victim. If

one victim is in close to shore and the other further away, strap the tube on the first victim and instruct him to swim or kick toward the shore, proceed to the victim who is further out. Another alternative is for one rescuer to swim out with two rescue tubes. Using this maneuver will slow the rescuer down due to the increased resistance of the second rescue tube. If there are two rescuers and two victims in the water, the rescuers shall split up and each shall manage an individual victim. Please give your thoughts on this paragraph.

In a situation where there are many victims, one rescuer can swim out with a rescue tube. By virtue of the four hand-holds and the fact that it has been pressurized with an inert gas, the rescue tube can support four conscious victims. The 500-foot lifeline is another alternative that you can consider. You can clip it to a rescue buoy or rescue can and swim to the victims. They can hold on and be pulled in by the crew on the beach while you assist in the water. If close to the beach, another consideration is to tie two throw bag ropes together and repeat the same above stated technique. The advantage of the rescue reel is that the rope floats, making the task easier.

When a second team of two rescuers arrives on scene, they can act as a utility team, or depending upon the conditions they can:

- Swim out to the victim using a different route. If the first team is swimming directly to the victim, look for a nearby rip tide and use it to get past the surf zone. This may prove to be faster than the direct in-line route used by the first team.

- Anticipate the drift, and enter the water ahead of the victim caught in a lateral current, then intersect with them.

- Deploy using different equipment. Respond in the rescue kayak or long rescue board.

- Swim out with the rescue line attached. When reaching the rescuer/victim, attach the rope to the victim's rescue tube that the first rescuer has placed on the victim, and the support crew on the beach can then pull in the victim.

Be aware that there may be more than one victim than was originally spotted. A check of the area should be conducted. Look for clothing near the water's edge that may indicate that someone may have seen the victim and attempted a rescue. Remember, a single victim rescue may be, in actually, a multi-victim rescue. Question all bystanders that witnessed the incident to establish if there are any other victims and bystanders have seen.

SECTION 6. ENVIRONMENTAL CONSIDERATIONS

There are a great many factors which create the shape, size, speed, and resulting power of waves. The three factors that have the most affect are the intensity of the wind, the time increment that the wind has in contact with the water's surface, and the distance traveled over which this contact takes place. Waves will typically travel at a speed of thirty-five miles per hour. Friction becomes a factor as the wave approaches the beach area and the depth becomes shallower. The wave will begin to slow since resistance is caused by contact with the bottom. The energy lost as the wave's speed decreases is converted to create the height of the wave. As a general rule, the steeper the angle of the beach, the closer to the shore the waves will break. This phenomenon is referred to as "shore break."

WAVE CATEGORIES

1. **SURGING WAVE:** A surging wave is the "calm" type of wave which may never actually "break" as it reaches the shore. It is usually characterized by a smooth, non-foaming swell. Its potential for danger to bathers, mostly children, is that they will underestimate the great buildup of water which will pull strongly as it returns seaward.
2. **SPILLING WAVE:** This wave is identified by the action of the white water as it "falls" down the face of the wave. It seems to have most of its energy neutralized by the wave of its origin. This type of wave is the easiest for swimmers and rescuers to swim through.
3. **PLUNGING WAVE:** The main characteristic of this wave is the fact that the wave will seem to break all at once with a tremendous force behind it. It is also referred to as a "Dumper Wave." This type of wave is usually regarded as the most dangerous to swimmers, especially those who are not accustomed to ocean conditions. Serious injuries can easily result from swimmers being driven to the bottom by the force of the wave as it breaks near shore.
4. **SLEEPER WAVES:** This type of phenomenon is prevalent in the San Francisco area. If the typical wave is 3- to 5-feet in size, an occasional wave 6 to 8 feet will wash in. This type of wave has been responsible for sweeping many victims (sitting or fishing from the rocks and cliffs near the waters edge) to their deaths.

RIP TIDES

San Francisco has always had warning signs at Ocean Beach describing "dangerous undertow". The use of this term is misleading, but it's connotation does provide an effective way of placing fear and awareness of the ocean's awesome power. The actual condition that is prevalent is a natural phenomenon known as "Rip Tide". Water will always try to seek its own level, and rip tides are one of nature's ways of balancing the shoreward and seaward flow of water.

Rip tides are the major cause of most drowning victims in the Ocean Beach area. The higher or stronger the waves, the more intense the resulting rip tide. Statistics indicate that 60% of all California ocean drownings were and will be caused by rip tides.

A rip tide will resemble a mushroom in shape. It will sometimes be flanked by sand bars running parallel on both sides. The portion of water running seaward is called the "neck". The "head" is where the resulting wash will begin to dissipate. The "pulling water" is referred to as the "feeder".

Swimming Out Of A Riptide

When in a rip tide, most swimmers will panic and try to swim back toward the beach in the opposite direction of the rip tide. The result will tire out the most proficient of swimmers. The proper technique, if caught in a rip, is to calmly let the rip tide pull you out to the area of the "head". At this point, you can swim parallel to the beach until out of the rip, then proceed to swim back to the beach. Rescuers can effectively use the rip tides to his or her advantage in order to quickly swim out through the surf toward a victim. While doing this, the rescuer will be swimming "with the current" when using the rip tide to his or her advantage. Rip tides have been known to reach speeds of five knots per minute. This is the fastest route in reaching the victim, but never a route to use in returning to the beach, especially with a victim.

Rescuers should make themselves aware of the prevailing conditions before entering the water. Rip tides are readily recognizable under most circumstances while on the beach. There are some telltales that can be effective in determining locations of rips. The most common sign of a rip tide found along Ocean Beach is discolored, brown, or "dirty" water resulting from the sand being churned up by the rip. Other signs are debris floating seaward, foam breaking further up the beach (indicating a channel), or a choppy, rippled, or "flat" appearance to the surface of the water through the breaker line. The rip tide often pushes down and flattens the oncoming waves. As your eyes travel along the surface of the water, you can usually see a marked difference caused by the rip tide.

LATERAL CURRENTS

Another condition that is prevalent, especially during strong surf conditions, are lateral currents. These currents will travel parallel to the beach. During one failed rescue attempt, two children were swept out in a rip tide past the surf zone. There were lateral currents traveling South on the left side of the rip tide, and North on the right side of the head of the rip. The body of one victim was found to the left and the other drifted to the right.

DROWNING VICTIMS

The usual candidates for drowning fall into distinct groups. Teenage children are the leading victims of drowning accidents in the United States. This statistic is echoed by the same results in the Bay area. Another group that is prominent in drowning accidents are young adult males between the ages of 19 and 25. Often for this group, alcohol or drugs have been used in quantities sufficient to impair physical and/or mental judgment.

Statistics also indicate that most rescues will occur late in the day or at sunset. Typically, the swimmers have been at the beach for the entire day. Body resistance is lower, food and drink usually have been ingested, and the body's energy reserves have been lowered or depleted. After a day of swimming in the surf, a person will begin to build a false sense of confidence for the ocean conditions. Wave and tidal changes often go unobserved.

The swimmer will not realize that they have pushed beyond their margin of safety and a potential drowning situation is created.

At this time of day, our most critical factors are the amount of time it takes for us to arrive on scene after the initiation of the incident and the potential of limited visibility caused by the loss of light as the sun goes down.

Surfers are often caught in a fast moving current and swept around the Land's End area. During daylight hours, this does not pose a great potential for danger unless they are swept close to shore and into the rocks. They will normally go with the current until they reach the beach areas by Mile Rock, then hike out. During and after sunset, this increases the potential of danger for them. Staff at the Cliff House or tourist (visitors) near the Land's End area will normally sense this danger and contact D.E.C..

TIDE AND CURRENT CHARTS

The Rescue Squads, Cliff Rescue, and Surf Rescue units carry a tide and current reference booklet. These tidal charts will indicate the size and the time of the high and low tides. This can be referred to while en route to an incident location.

Most tidal charts are set up to indicate the tidal shifts past a known landmark. Common for our area, most books will list the Golden Gate Bridge as the landmark with which all reference times will be adjusted. By consulting this resource, we can establish the probability of the current conditions. Additional tide/current information may be obtained from the Division of Training upon request.

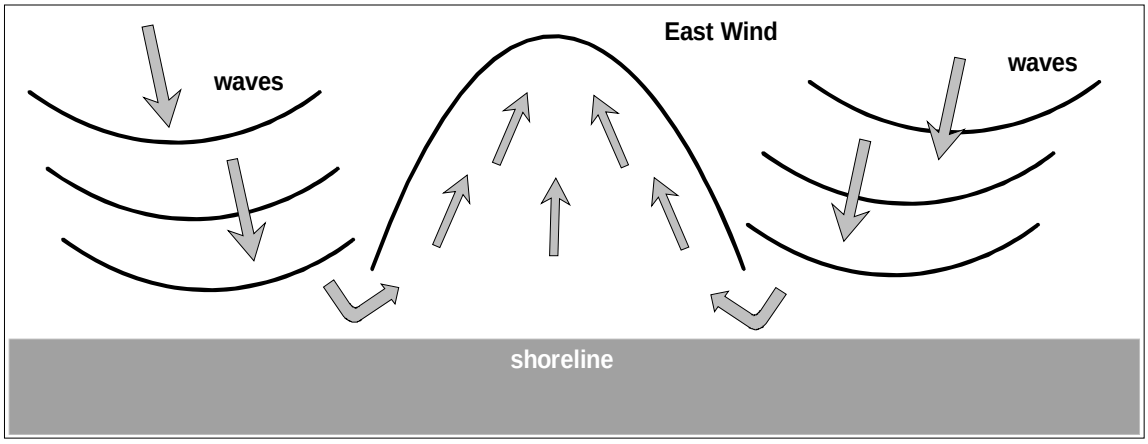
The greater the difference from low to high tide (and visa versa), the greater the movement of the volume of water. The more water that passes a given point during an increment of time, the stronger the resulting current. As a general rule, the direction of the current will follow the tide.

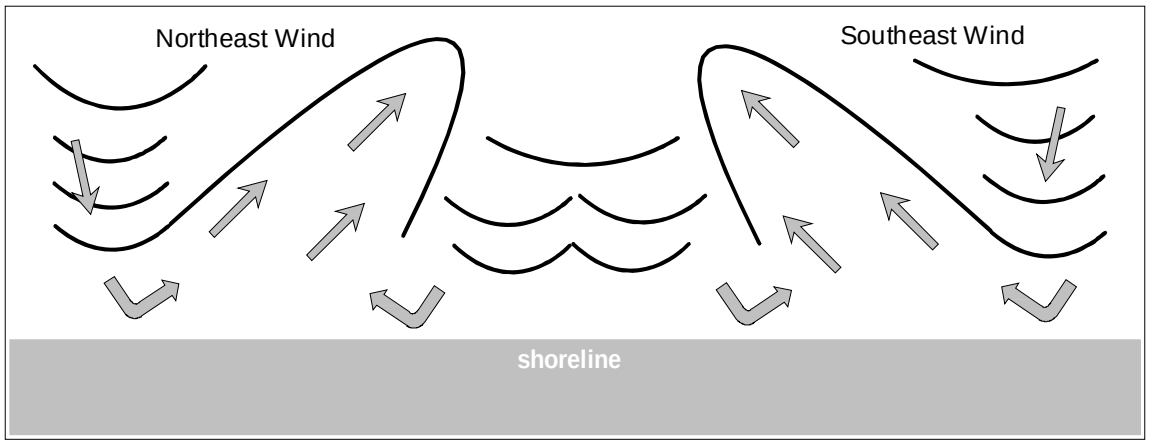
For example, as the tide is incoming and entering into the San Francisco Bay through the Gate, the current will be running in the same direction. Along Ocean Beach, the current will be from the South, moving Northward, behind the Cliff House, passing China and Baker Beach, and running toward the Bridge. The reverse of this condition is true for an outgoing tide for the current will be in the opposite direction. We can use this method in order to predict the direction that a victim will drift but, it should be noted that the prediction will not be foolproof. In some cases, lateral current inside the surf zone or rip tide action may cause the victim to drift in a different direction.

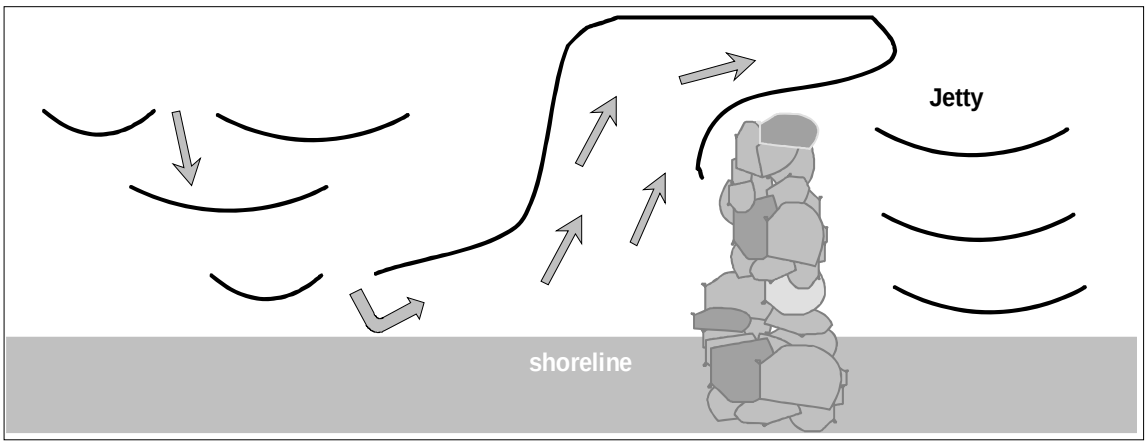
Sand bars running along the breaker line and swift incoming tides and currents often cause a reverse and venturi action in the surf zone. Usually, the area behind the breaker line will drift in the direction predicted in the tidal charts. The area in the surf zone does not necessarily follow this. Even though time is of the essence when making a rescue, always try to see what direction a floating object in the water is drifting in order to give you a guide to the current flow. Fixing your eyes on the victim will often give you a directional movement guide.

Weather (storm surf) and a change in barometric pressure can alter the information found in the tidal charts. Higher tides may cause resulting currents to be stronger than predicted.

RUNOUTS
(overhead view)



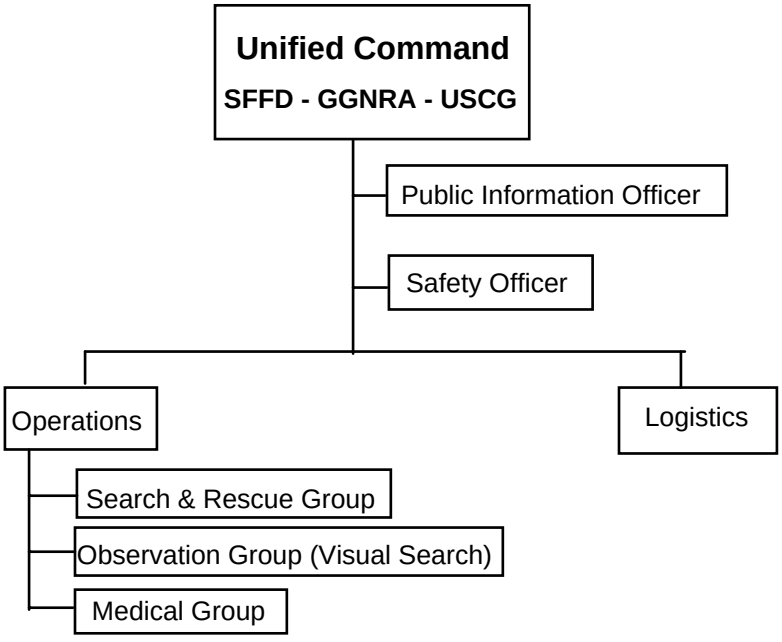




SECTION 7. INCIDENT COMMAND SYSTEM

In November of 1990, the San Francisco Fire Department implemented the Incident Command System. The system was instituted to more effectively manage emergency incidents or disaster and to establish unified command during multi-agency incidents. The standards for the system were established to conform with the requirements of the California Standardized Emergency Management System. The Incident Command structure will ensure better command, control and coordination of resources.

Most of our rescues will involve a multi-agency response. For a typical incident, our use of the Incident Command System will have a limited span of control. At an incident, there will be an Incident Commander (Division or Battalion Chief), Operations Section Chief, Fire Branch Manager, Rescue Group Supervisor, and Medical Group Supervisor. In most situations the BC or AC will assume the role of IC, Ops., and Fire Branch and designate Rescue Group and Medical Group Supervisors. A Safety Officer will always be assigned..,A Staging Officer will be assigned during larger incidents. (Ref: Incident Command Manual for more detailed information on the SFFD Incident Command System).



INCIDENT COMMANDER'S DUTIES

1. The Incident Commander has the overall responsibility for the management of the incident. Not only will he or she be directing the Fire Department units, but will be in contact with the Coast Guard Helicopter, Park Police, Park Service, Coast Guard rescue vessels, and EMS Ambulance Crew.
2. The Incident Commander shall establish a command post, assign ICS positions, establish operational objectives, and a communications plan. He/she will keep the Communications Center abreast of all pertinent information.
3. The Incident Commander shall insure that all safety precautions have been considered and implemented. The IC will appoint a Safety Officer.
4. The Incident Commander shall insure that an aerial ladder has been raised as a spotting platform where and when it is feasible.

JURISDICTION

Most of the areas of our response will fall under the Golden Gate National Recreational Area jurisdiction. The San Francisco Fire Department will have seven vehicles and twenty-eight firefighters responding to a typical water, cliff, or combination cliff/water rescue incident.

Due to the large commitment of San Francisco Fire resource at an incident, the Park Service will allow the Fire Department to assume the role of Incident Commander. They request that we allow them an advisory role in the development and implementation of the overall strategy. When arriving on scene, the Battalion or Division Chief, upon assuming the role as Incident Commander shall attempt to make contact with the highest ranking Park Service member. In many locations in the Land's End area, the Park Service Personnel's familiarity and knowledge of the trail systems, topography, and evacuation routes, will prove to be a valuable resource. The Rangers are highly trained and have proven a valuable asset in the past. Our Department has ongoing cross training with the GGNRA Personnel for water and cliff rescues. Recommendations from GGNRA Park Rangers and U.S. Park Police shall be given the highest consideration.

BEACH DIVISION—RESCUE GROUP SUPERVISOR

Duties of the Rescue Group Supervisor

1. The RGS will assign and deploy rescuer(s) as quickly as safety will allow. The RGS will assign a RIT made up of two rescue swimmers suited up

and ready to enter the water.It is important to keep track of the number of rescuers are in the water. Ensure witnesses are interviewed and secure as much information as possible.

2. Inform the Incident Commander of the need for additional resources. If the victim has not been located, rescuers should be held in a location that will allow them to reach any potential rescue site quickly. In the area adjacent to the Sutro Bath area, there are many beaches and access points where a victim can drift to.

3. Constantly brief and update the Incident Commander of the current situation and tactics being implemented. The RGS will be responsible for the management of the rescuers. The Incident Commander will be responsible for the overall scene management and the coordination of the multi-agency response. **For the system to work efficiently, it is imperative for the RGS and Incident Commander to maintain control of the incident.**

4. Update other agencies via portable radio of all pertinent information. Ascertain whether the inflatable boat, helicopter, or Coast Guard vessels have been deployed. Marine channel 21A, 22A, or 83A are the accepted working channels of all rescue agencies at a multi-agency water rescue incident.

5. When first on scene and upon establishing victim location officers shall update the Communication Center on the situation and relay accurate directions for all incoming companies. The Land's End map will be effective for this purpose. Always check with the Communications Center to ensure that the USCG has been notified.

There is no rigid procedure set regarding who is qualified to assume the role as a Rescue Group Supervisor (RGS), although it should be a member who has been trained in water rescue procedures. In the event that the first due company officer is the only member of the crew qualified as a water rescue swimmer he or she will become part of the primary rescue or RIT team and an officer or surf rescue trained member from a secondary unit will assume RGS. A typical initial response to a water rescue would as listed below.

San Francisco Fire Department

Cliff Rescue Unit	1 Officer, 3 Firefighters
Rescue Squad	1 Officer, 3 Firefighters
Battalion Chief	1 BC 1 I.S.S.
Surf Rescue Unit	2 to 4 rescue swimmers
Truck Company	1 Officer, 4 Firefighters
1 or 2 Engine Cos.	1 Officer, 4 Firefighters
1 ALS Medic Unit	1 EMT-P, 1 EMT

Golden Gate National Recreation Area
4x4 on the beach
Zodiac or RWC from China Beach

US Coast Guard
Helicopter from San Francisco Airport
Vessel from Station Golden Gate

SECTION 8. RESCUE HELICOPTER, VESSELS, AND ACCESS

Since most of the water rescue incidents will be conducted on a multi-agency basis, Department members will be working along with the United States Coast Guard. In order to utilize this potential to the fullest extent, it is important to have a full knowledge of the scope of their ability and equipment. A CHP helicopter is also available with a paramedic onboard at all times. They also have the ability to pickup a SFFD rescue swimmer to assist in the rescue.

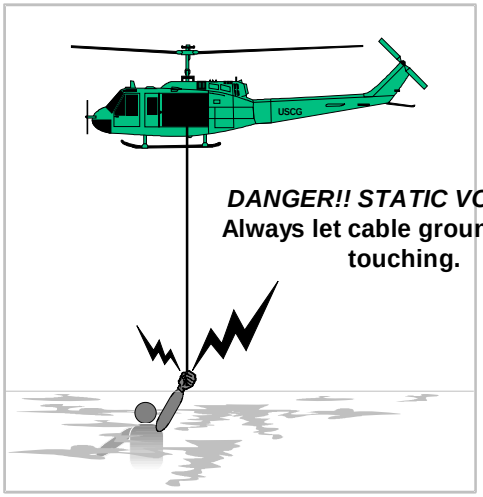
If a rescue attempt is at dusk or after nightfall, the Incident Commander should inform the Communication Center of his or her need for the Coast Guard Helicopter and its lighting capability. For swimmers who are lost in the Land's End area, porta-beams, light stands, generator, cables, etc., are carried on the Cliff Rescue 1, Surf Rescue 18, and the Rescue Squads. These lights can be energized prior to and in conjunction with the helicopter to light the area. **CAUTION:** It is imperative that shore deployed lights are not pointed in the direction of aircraft blinding aircrews or negating their night vision.

HELICOPTER OPERATIONS

There will be occasions where the victim of a surf and/or cliff rescue will be evacuated by helicopter. The use of helicopters can provide for quick and smooth transportation of a victim. When the helicopter is on scene, extreme caution is imperative because of the inherent risk in helicopter operations.

The HH-65 helicopters now used by the Coast Guard are extremely maneuverable and quick on scene, but the byproduct is an extremely strong rotor wash. It has been rated in excess of one hundred and ninety knots per hour at a height of eighty-five feet (a common working altitude). Rescuers should retreat to an area of strong footing if on the protruding land masses of the cliff areas. If the helicopter is to be effective, many times the pilots will request that the cliff areas be cleared of all spectators and non-essential personnel. The United States Park Police and/or the San Francisco Fire Department can accomplish this task.

It is useful to update the helicopter crew of hazardous conditions. Anytime power lines, civilians onlookers, and loose/light items are visible in the target area, give a short verbal assessment to the crew of the helicopter. Prior to transporting a victim with injuries, the aircrews appreciate having an update so they can prepare appropriately for the victim. The space on board is very small and this information can be extremely helpful to them. Inform them of the nature of the injury (back/neck injury, broken limbs), current condition of victim (stable, unconscious, alert and oriented), and first aid already applied (splint, C-spine collar etc.).



Whenever the helicopter lowers a line or rescue basket, it is imperative that the rescuers allow it to contact the ground or water before making physical contact. This is to discharge static electricity built up by the helicopter. This shall be done each and every time. Failure to do so will cause bodily injury to the rescuer. The normal Coast Guard procedure is to lower a rescue basket with a helicopter crew member to the scene, allow rescuers to disconnect, pull away, hover, and return to scene after the victim is secure in the basket, before hoisting. This procedure will allow the rescuers to verbally converse and work without the noise and turbulent winds caused by the engines and rotor wash.

Don't hesitate to request a helicopter. There night vision capability and/or, high intensity light capability, can be used for searching the shoreline and cliff areas, and for victim evacuation providing it meets the following criteria: First, all airlift rescues provide a certain element or potential for harm. Therefore, if it has been determined that if there is no safer way to evacuate the victim, or that the victim's injuries are such that immediate airlift to a hospital is indicated, then the helicopter can and should be employed as a means of evacuation.

It is common practice for the Coast Guard to establish visual contact with a potential drowning victim and deploy a rescue swimmer from the helicopter. The rescue swimmer will determine if the victim will be hoisted into the aircraft or picked up by a vessel.

The United States Coast Guard will use the VHF marine radio channels 16, 21A, 22A , and 83A to communicate with the San Francisco Fire Department and the GGNRA. With the use of the portable radios carried on the Surf Rescue and the Cliff Rescue vehicles, the Department has the ability to talk directly with the Coast Guard helicopter, rescue vessels, or dispatcher using channel the mentioned channels above.
SFFD land based units not equipped with marine radios may communicate on marine frequencies using the following methods:

- The handheld Bendix King radios have marine channels 16, 21A, 22A, and 83A programmed for use.
- The Kenwood mutual aid radios have various marine channels programmed for use.
- The SFFD 800 MHz radio system can patch into a marine frequency for use.

At times, the Coast Guard helicopter will deploy a battery operated radio transmitting beacon into the water in order to establish the direction of currents. It is approximately

30 inches in length, red in color, and looks like a toy rocket. It is used for body location and recovery. As a courtesy, we will retrieve it if at all possible.

RESCUE VESSELS

On the majority of our rescue attempts, the United States Coast Guard and/or GGNRA rangers will be responding with their vessels to assist. All United States Coast Guard vessels are equipped with radar, GPS (Global Positioning System) navigation system and a full array of communications equipment The Coast Guard will respond from Station Golden Gate, which is located near the north tower of the Golden Gate Bridge. They will usually deploy with a crew of four members and have a six to eight minute response time to Ocean Beach.

Some of the Coast Guard members have cross-trained in the SFFD Water Rescue Program and familiar with our procedures. Under normal conditions, the Coast Guard will also dispatch their 47 foot surf vessel. Because of it's shallow draft and construction, the 47' MLB is capable of riding through the breaker line into the surf zone. Many times, the 47' MLB will retrieve the victim and rescuers and transport them back to Station GG.

The GGNRA has two inflatable boats located at their facility at China Beach. If they have a qualified operator on duty, they will respond to that location and may enlist the services of the Fire Department in launching and responding in the inflatable boat (usually Engine 14). The model of inflatable boat that GGNRA operate is made of high-impact rubber. It is capable of riding up onto a beach, even in high wave conditions.

If a rescuer has reached a victim, he or she shall look back to the beach for a two flag signal indicating whether or not there is a boat responding. It is considerably safer for both the rescuer and victim to ride rather than to swim in through the surf zone. Doing this will also fulfill two purposes. First, it will allow for another first-response medical trained person to help with the needs of the victim. Second, it is safer for the rescuer. Should the inflatable boat leave the scene with the victim, it may not be able to return to assist the rescuer(s) should they run into complications while returning to the beach. Remember, rescues will always occur under the most unfavorable of circumstances and any method we use to increase rather than diminish the margin of safety shall be utilized.

There will be some locations, mostly in the area between Sutro Baths and China Beach were conditions will make it unsafe for the Fire Department to deploy rescue swimmers. The inflatable boat and USCG helicopters are the only safe way to evacuate a victim from the water. In a case like this, the role of the Fire Department may be to visually locate the victim and relay the information to the responding rescuers. Signal flags, along with the portable radio, can be used to help the Coast Guard to pinpoint the location of the victim. If the victim is in the rocky areas of the cliffs, throw ropes or

ceiling hooks may be employed to snag the victim should the circumstances deem it unsafe for a swimming rescue.

On some cliff rescues, it may prove easier and safer to lower the victim to the beach and evacuate him via the inflatable boat. The Water Rescue team members shall assist the Cliff Rescue Team, as needed.

ACCESS POINTS AND TARGET HAZARDS

The officers and firefighters assigned to companies that respond to surf and cliff rescue incidents shall familiarize themselves with the different access points that may be used to reach common or remote areas. It is good practice to consider route alternatives should construction, washouts, or other variables affect the usual route. The Cliff Rescue Unit located in Station 34 is a four-wheel drive vehicle. For all dispatches to the northern end of Ocean Beach, this unit will respond to the ramp at Mile Marker 15. (The stairway openings along the beach walkway are numbered for reference-Mile Marker 15 is at the northern end of the parking lot adjacent to Fulton Street.) By reducing the tire pressure from 42 psi to between 18-25 psi, the vehicle can travel over the soft sand at the beach.

Depending upon the tides, the four wheel drive may be capable of driving the length of Ocean Beach. There are tidal conditions when it becomes impossible to negotiate around a pond of water which forms near the southern end of the beach. Should this occur, the Cliff Rescue apparatus will be dispatched to the south parking lot, in front of Sloat Boulevard, near the sewer transfer station and use the adjacent beach access. This is the common route taken for first aid calls involving hang glider accidents that occur near Fort Funston. An alternate route onto Ocean Beach an access route at Lower Great Highway and Lincoln Way. If additional four-wheel drive vehicles are necessary, a Battalion Chief’s buggy equipped with four wheel drive should be special called.

The majority of the rescues reported to us are children playing in the surf. They fall, get pulled out by the currents, and can soon become "statistics" if external evasive action is not taken immediately. The victims that we deal with on Ocean Beach can usually be categorized into specific groups.

Kelly's Cove

During the summer, there are a number of who visit the beach area. Many are totally unaware of the dangers posed by the ocean conditions. This will usually happen around the Kelly's Cove area below the Cliff House. Surfers have gotten caught in a lateral current and pulled around behind the Cliff House. Even though they may not be in immediate trouble, it is a high visibility area and onlookers will usually report it. Coming into the rocks is the greatest danger for the surfers.

Sutro Baths

For a victim behind the Sutro Bathes area, there is an access point near Merrie Way (adjacent Louis' restaurant). The narrow access road will split after 150 yards. The upper road will take you to the Observation Deck. This location has proven an excellent advantage point to use in locating a victim in the water. It will allow for a panoramic view of the area extending from behind the Cliff House to Camel Back Rock. This Observation Deck also provides us with a good location to establish Beach Command (Operations) when there is a report of a surfer caught in the current behind the Cliff House.

The lower road will terminate at the tunnel entrance below the Observation Deck. There is a small beach at the bottom that fronts the ruins of the Bathes. A prominent landmark and fishing location, Fisherman's Rock is located off this beach. There was a manmade land bridge connecting Fisherman's Rock with the cliff areas behind the Cliff House. The bridge was demolished by the Park Service in early 1992 in order to discourage the fisherman from using the rock. Fishermen continue to out to the rock on low tide, remain through the incoming tide, then leave on the next low tide cycle.

The Department has had rescues when the waves are crashing over the Rock and the fishermen need to be evacuated. Fisherman have slipped or been swept from this point. There is another popular spot that is illegally frequented by the fisherman. It is located on the western point below the Observation Deck. Though there are signs warning of danger, this is still a popular location. The concrete and rocks where these fishermen stand are covered with slippery water-borne growth. Should someone fall into the water in this area, they will probably be unable to climb or self rescue. Contributing to their dilemma, the surf in this area is dangerously unstable at all times.

There is a 75 foot tunnel at the North end of this beach which accesses a beach below the Observation Deck. There have been a number of victims that have been swept from the rocks on this beach by sleeper waves. The wave action and currents in this area have proven extremely hazardous. Should there be a call for someone in the water in this area, the first rescuers can go to this beach, a follow-up group should respond to the Observation Deck, and others can take the footpath north to the outcropping between The Deck and Camel Back Rock. This will allow good visual coverage from the Cliff House to Camel Back Rock, both in the water and on the beach areas.

There is a locked gate off of El Camino Del Mar near Seal Rock Drive which will access a road that will parallel the water and cliffs for about one-half mile. Using this route will afford us a view of the area below, allow for good radio and flag communication (with USCG and GGNRA), and access via pathway to the beaches below. The key for this gate is carried on the Cliff Rescue 34, Surf Rescue 18, Battalions 7 and 8 chief's vehicles.

China Beach and Baker's Beach

The Department has responded to China Beach for water rescues and also to assist the GGNRA Park Service in launching the Inflatable boat. It was once known as Phelen State Beach and has remained labeled as such on some maps. This beach can be located by way of El Camino Del Mar to Sea Cliff Avenue. There is a gate at the top and Battalion 7 has a key should the gate be locked. Baker Beach is located on the Presidio GGNRA. It is a popular beach during warm, sunny days. It is a long flat beach and the waves are usually small and break right on the shore. You can reach this beach by taking El Camino Del Mar to Lincoln Boulevard to Gibson Road. If the Department has an incident on this beach, the GGNRA Rangers are usually on the scene prior to our arrival. They will direct us to the incident location. The Presidio Fire Department will also receive the dispatch.

MULTI-AGENCY MAPS AND ESTABLISHMENT OF INCIDENT LOCATION

Victim location was one of the problems that we have faced since the inception of the Water Rescue program. In 1992, the Fire Department, Park Service, Park Police, and Coast Guard agreed to use maps with the same standardized coordinates. This aerial map has been labeled to indicate the universally recognizable landmarks, routes, and access points. While responding on Department apparatus, the officer should make the map ready for use should the Communications Center relay route or incident information. The map can also become useful in size-up, route and evacuation determination, and multi-agency communications.

The maps have been issued and are committed to regular inventory on the following companies and units.

- Rescue Squads 1 and 2
- Cliff Rescue 1
- Surf Rescue 18
- Trucks 14, 18, 19
- Engine 14, 18, 23,34
- Battalions 4, 7, 8
- Division 2
- Communications Center
- Division of Training

Determining the incident location should be a priority for public safety agencies receiving assistance calls.

Should the Communication Center be notified by the Park Service or the United States Park Police, there is a good probability that they are on scene and have secured witnesses. If the Communication Center was notified directly by a witness or from DEC,

the most important factor upon arrival is to locate the witness(s). The important points that should be confirmed by the witness(s) are:

- Where was the person last seen?
- What has happened?
- Did the person fall into the surf?
- Was the person conscious? How well did the person swim?
- Did the person suffer any impact injury? Had they been drinking?
- What time did this happen? (It important to establish the accuracy of this answer
- In the excitement and/or under the stress, most people will distort the time increment.)
- Did they check a watch or did they guess? (Qualify accuracy of answer).
- If they ran to a phone, how far (time increment) did it take after they witnessed the incident?
- What was the age, physical stature, color of hair, and clothing of the person when he or she went into the water?
- What was the relationship of the witness to the victim? Relative or bystander?

Try and keep the witness(s) available for the duration of the incident. Further information may be needed by the agencies on the scene. It is a good idea to question the witness personally rather than depending upon second person information.

Establishment of the time becomes an important element in the determination of strategy that will be implemented. Time will often be the most important facet in whether this will be a rescue attempt or a body retrieval.

SECTION 9. FIRST AID IN SURF RESCUE INCIDENTS

As stated before in this manual, a subsequent arriving company shall make available first aid equipment to the location where the victim will be evacuated from the water. Effort should be made to secure a backboard due to the probability of head, back, neck, or the need to have a firm surface on which to perform CPR at the ocean's edge.

On many of our rescues, we will be faced with victims who have suffered an injury tumbling in the surf, or more probably, an injury that triggered the fall into the surf. In both cases, it is always a safe assumption that any victim in the water may have suffered from a head/neck/back injury. The following section will deal with some of the more common occurrence and will give you some insight of what you should suspect when on scene.

HEAD INJURIES

Many victims that we deal with are unconscious. The probability factor is high that head injuries may have been the triggering mechanism or the result of the drowning. For treatment, the first responding personnel should follow the procedures considered as standardized Department protocol. Airway management is always the first consideration. Because of the evidence that supplemental high-flow oxygen may result in less swelling to the affected area in a head injury, administering oxygen shall be one the first priorities. In order to protect the victim from any further injury, cervical spine stabilization shall be performed. The victim's baseline level of consciousness shall be determined and continually monitored every ten minutes for any evidence of change. EMS personnel should be updated when they arrive on scene. When checking the victim, you shall:

- Establish the level of consciousness
- Check vital signs-blood pressure and pulse
- Check pupil reflex at the extremities
- Check motor reflex at the extremities
- If conscious, ask victim's name, date, where they are, etc.
- Observe verbal response for signs of altered mental status.

Any victim who has suffered an impact great enough to cause injury to his or her head shall be evaluated for other possible injuries. A secondary survey shall be performed and can be done at the same time as removing wet clothes.
(Re: Removing victims wet clothes will eliminate heat loss and reduce probability of hypothermia. Use a ThermoBlanket* to stabilize body heat)

LUNGS

A drowning or near-drowning victim shall always be advised to seek medical attention after the incident. Even though they say that they feel all right, they may later suffer from water that was ingested into the lungs. Bacteria may be transmitted into the lungs from contaminated water and may not show signs of injury for days until it has had a chance to grow. Salt water in the lungs can cause pulmonary edema. Salt water will "pull" the water out of the cells and into the lungs. Fresh water can cause irreversible damage to the alveoli of the lungs by causing the red blood cell to rupture when it dilutes the electrolyte balance in the bloodstream.

SPINAL INJURIES

Anytime the victim has been tumbled in the surf, there is a strong possibility that he or she may be suffering from a spinal injury. C-Spine precautions shall be administered. If it is possible to have a backboard available when removing the victim from the water, he or she shall be placed on the board first, then secured and removed. If the GGNRA is on scene and has a Miller Board available, it should be considered over a regular backboard. The Miller Board will literally float the victim over the surface of the water while maintaining C-Spine stabilization. Rescue tubes can be secured underneath to increase the buoyancy factor making the task of maneuvering the victim easier.

LOWER LEG INJURIES

In a number of incidents, we have responded to children who have suffered from lower leg injuries. The mechanism which usually causes the injury is a floating piece of driftwood, power pole, or broken piling. A three hundred pound float may look harmless until the child falls off and slammed in the shin with it. Broken bones, oftentimes compound in nature, are the result. Shock shall be one of your considerations. This can be compounded by the onset of hypothermia.

ALTERED MENTAL STATUS

When making a mental evaluation of the victim who shows signs of altered mental status, the firefighter shall not overlook the fact that the persons actions may be caused by the following:

- Injury Induced - Was the victim injured in the surf and/or was the victim injured prior to entering the surf?
- Could the condition be drug or alcohol induced?
- Was the person suicidal or suffering from a mental dysfunction or condition?
- Are the victims actions the result of early or mid-stages of hypothermia?

HYPOTHERMIA

Hypothermia is a physical condition in which the body's core temperature has decreased to a point where normal muscular and mental functions become impaired. In an attempt to counter this condition, the body will constrict the capillary blood flow to the extremities. This will cause the muscular output to begin to diminish. A person will use up more energy in physical activity (swimming) which will lead to more rapid exhaustion.

Heat loss will occur when a person is subjected to cold water for any length of time. There is a direct proportion in that the colder the water, the shorter the time increment needed to cause hypothermia. As the body temperature diminishes, the impairment becomes more pronounced. In the last stages, the person will suffer from severe muscular rigidity, weak heart beat and pulse, dilation of the pupils, and low level of consciousness. Death will occur from the cessation of the heart when the body temperature drops below 82 to 78 Degrees.

Some early signs of the onset of hypothermia can be fatigue, confusion, weakness, and/or lack of alertness. Depending upon how severe the exposure or environment, the interval between the onset of the symptoms and the potential of collapse may be very short. If the victim shows signs of lowered level of consciousness or lack of muscular coordination, hypothermia is already at a dangerous level.

After a rescuer has brought a hypothermia victim to the beach, every effort shall be made not to subject the person to any undue movement. Any harsh treatment can cause the heart to go into ventricular fibrillation. **The Defibrillator shall not be used if hypothermia is suspected**. Cold, wet clothing shall be removed from the victim and the victim should be wrapped in a blanket. Even though the body, at this point, will not be capable of generating heat, you are taking a positive step in reducing the source of heat loss.

If the victim is suffering from bradycardia and apnea (slow or non-discernible heart beat and breathing), CPR will be performed until the victim is transported via ambulance to the Hospital. Appropriate patient management, (drug therapy, body rewarming, etc.) will slowly take place at the hospital under a controlled environment. Defibrillation will be performed only after the body has been rewarmed. A victim shall not be pronounced dead in the field until the body has been rewarmed to normal temperatures.

When Hypothermia is a consideration, the following procedures shall be followed:

- Remove the victim from the cold environment as soon as is possible.
- Remove wet clothing and keep the victim dry. As you remove clothing, check for
- signs of injuries.
- Insulate body with use of blankets, turnout coats, etc.
- Prevent convection loss by erecting a wind barrier.

- **DO NOT SUBJECT THIS VICTIM TO ANY JOSTLING**. Treat this victim very gently. Failure to do this can compromise the physiological status of the person.

A positive byproduct of cold-water drowning is that there have been many documented cases where the victims have been considered clinically dead and then were successfully resuscitated with little or no ill effects.

Studies have shown that the younger the victim, the shorter the submersion time, the colder the temperature of the water, the less the struggle, and the quicker the person received CPR, the better the chances were for survival. If a rescue is ongoing, the IC must ensure a unit is available with appropriate resuscitation equipment and backboard at the waters' edge in anticipation of possible CPR when the rescuer/victim reaches the beach.

SECTION 10. UNDERWATER DIVING OPERATIONS

INTRODUCTION

San Francisco Fire Department underwater diving operations are centered on the Rescue Companies. The Rescue Companies are equipped for diving operations, and staffed by officers and firefighters who are certified as Open Water Divers and NAUI (National Association of Underwater Instructors) Fire Service Divers. The Rescue Companies can deploy two teams of primary divers, two safety divers and two dive certified officers to act as diving supervisors in a very short period of time. The dive teams can perform a variety of water related tasks, including search and rescue, recovery and fire fighting. The dive teams are available to assist other agencies upon request.

The San Francisco Fire Department has a real need for skilled personnel who can quickly deploy, and operate safely and effectively in an aquatic environment.

This section will discuss the various missions and procedures regarding underwater diving operations. This section will not address team member selection, medical aspects of selection and/or training, specific equipment assigned to the Rescue Companies, or dispatch procedures.

All medical related inquires shall be address to the Department Physician. Training, equipment, and dispatch related inquires shall be addressed to the Division of Training.

SAFETY, PROCEDURES AND POLICIES

Every dive team member and officer must be intimately familiar with the written and unwritten standards, procedures and policies of the dive team.

Since diving operations have a greater potential for death and injury than many fire department operations, it is imperative that all members involved in diving operations have a firm grasp of the team's top-side and underwater safety and accident management procedures. These should include:

- Conscious and unconscious diver rescue
- Emergency line-pull signals (See IV, Underwater Search Methods)
- Identification and handling of diving related injuries
- Recompression chamber locations and treatment procedures
- Use of underwater communications equipment

As part of safety training, units quartered with the Rescue Companies shall participate in underwater drills as surface support.

AQUATIC RESCUE

Search and Rescue operations can take many forms and require a variety of skills. Conditions could vary from zero visibility, strong current condition, or extremely dangerous auto or aircraft victim extrication. Whatever the dive team or wherever the rescue, time is always critical when operating in a search mode.

Until the victim(s) have been found, there is no way to ascertain their condition. Exposure, hypothermia, hyperthermia, dehydration, starvation, exhaustion, traumatic injury, shock, and even panic are all potential killers when left untreated or uncontrolled.

There is a considerable distinction Rescue Mode and Recovery Mode in fire department diving operations. The decision between Rescue or Recovery is usually dictated by the possibly of survival of the victim(s). If there is even the faintest possibility of saving a life, the team will go into a fast Rescue Mode, but if there is no chance of a "save", the team will fall into a slower, more methodical Recovery Mode.

The possibility of a save/rescue will be directly tied to time, and this can vary from operation to operation. Obviously a submerged victim or potential drowning is more time-critical than a diver missing in a cave system where there may be air pockets or a capsized ship where survivors may be able to survive for several hours or even days.

Temperature also plays a big part in survivability. In general, a person missing in sub-zero temperatures is given less chance of survival than one in more moderate, less hostile environment. It would appear then that colder water temperatures reduce one's chances of survival, and there are many times when this is true. But there is one unique situation where cold water can play a big part in the possibility of a successful rescue. This is what has become known as COLD-WATER NEAR-DROWNING and is attributed to a human response similar to Mammalian Diving Reflex.

The Mammalian Diving Reflex in air breathing mammals such as whales, dolphins and porpoises is a physiological response in which the breathing stops, vital signs slow and blood is shunted away from the extremities/non-essential tissues to better supply the vital organs. This allows the mammals to make prolonged, deep breath holding dives.

Where sea mammals will remain conscious and active under these conditions, a human will lose consciousness and give a convincing appearance of death. The near drowning victim will not be breathing, skin will be pale or bluish, pupils will be fixed and dilated, muscles will become rigid and pulse will be absent or so faint it will be barely detectable.

Rescues and successful revivals have been performed on victims that have been immersed for over one hour, although 20-40 minutes is the most common occurrence. Even though the greatest success has been experienced with young children, older victims should not be denied every attempt at resuscitation after extended submersions.

SCENE EVALUATION

From a dive rescue standpoint, the scene must be evaluated not just for the rescue considerations and Last Scene Point (LSP), but also for the physical characteristics that could add danger to the task. The Rescue Company officer, or his designee, acting as Diving Supervisor must decide if the risk of committing his team to the water is justified by the chance of making the rescue.

This has become known in the military and dive industry as the RISK/BENEFIT FACTOR. There is definitely no point in throwing good life away trying to recover someone who is already dead or has a low probability of survival. The diver must be assured a good chance of rescue.

Strong currents, jagged metal, deep water, night operations in unknown areas, difficult entry points, poor visibility and weather, approaching storms, lightning, heavy boat traffic, polluted water, toxic waste, chemical contamination or a combination of the above must be considered before anyone is committed to the rescue/recovery.

If the following information has not already been collected, the Incident Commander will need to establish the nature of the accident, number of vessels/vehicles involved, number of victims involved, and ages of victims. The next steps are:

- Decide if this is to be a RECOVERY or RESCUE based on time.
- Establish a Risk/Benefit Factor
- Establish a Last Seen Point and mark it
- Study winds and currents for any changes in speed or direction
- Establish surface support team
- Select and brief divers and support team
- Prepare emergency personnel to handle victim(s)
- Review dive procedure and signals
- Initiate dive

WITNESS INTERVIEW

Trying to find a submerged object in a large expanse of water such as San Francisco Bay or even Lake Merced, when no witnesses were present to see an object go down, can be very frustrating, if not a futile exercise. Therefore consider every witness a valuable resource, with the potential of being helpful to the rescue/recovery effort. The following is a guide to witness interview.

- Establish most reliable witnesses (not drunk or drugged) and keep him/her at hand
- Return witnesses to their original view points when accident occurred
- Separate witnesses and assign interviewer

- Maintain control and an objective attitude
- In dealing with family members, explain the mechanics of the rescue, but
- Make no promises.
- Child witnesses may respond better to female interviewers
- Use reference points to establish Last Seen Point
- Be sure to see witnesses' ID and establish an address and telephone number so that a witness can be called back if necessary.

DIVE PLANNING AND BRIEFING

Like any underwater operation, the most successful dive rescues will be ones that are carefully planned and professionally executed. Between the planning and the execution comes a most important part of any operation, the briefing.

Training and experience will give the team leader the repertoire of skills and knowledge to develop a functional rescue plan. The divers, as with the support team, must be in full possession of all the facts and dynamics affecting the rescue. A clear understanding of their individual assignments and how they relate to the big picture is essential if the team is to appear professional and the rescue is to be deemed a success. The divers should be part of the planning process since only they understand their own limitations and strengths. It may be necessary, in some circumstances, for a diver to make a quick dive on the site to establish water and bottom conditions, or vehicle/aircraft attitude or location, before a final plan can be formulated.

The briefing should include:

Situation

- A brief overview of the entire operation
- What led up to the rescue/recovery
- Sea state or water conditions
- Number of victims
- Last Seen Point
- Availability of additional emergency personnel

Mission

- A short statement of purpose
- Recover the victim from the vehicle, or
- Locate the vehicle and attach recovery cables, or
- Rescue boat survivors, etc.

Execution

- A detailed dive plan of exactly how the mission is to be accomplished, leaving no doubt in anyone's mind as to the mechanics of the rescue attempt.
- Diver's role, dive time and maximum depth

- Divemaster's responsibilities
- Procedures for body or vehicle recovery
- Contingency plans

Command and Signals

- Who is Incident Commander and Diving Supervisor
- Assigned dive team leaders
- Diving rotation for prolonged operations
- Who is PIO, and how to respond to press
- Line-pull signals, hand signals, or other communications modes
- Day/Night flares and procedures
- Abort and emergency abort signals

Most dive rescue operations will be extremely simple in nature, and as long as basic procedures and common sense rule, the operations will be successful. Major disasters such as passenger airliners, trains and buses going into the water will grossly overtax the capabilities of the fire department teams.

Upon arrival all new dive teams and support personnel need a thorough briefing. If the site is congested, fresh teams can be kept in a staging area until needed. Fatigued divers should be moved to a rehab area for rest, food and debriefing.

DEBRIEFING

Every major and most small rescue and recovery should end in a debriefing of the entire operation. There is much to be learned from each experience so that improvements can be made to future operations. The whole operation should be broken down step by step to find fault, make constructive criticism and possibly rewrite policy and procedure.

There is one other area that can be covered in the post-dive debrief. That is, the effect on members on the team of loss of life and or the stress of body recovery. Emotions, feelings, and job stress can run high when dealing with death and injury. The Department Stress Unit should be contacted to conduct a Critical Incident Stress Debrief if it is at all indicated.

UNDERWATER SEARCH METHODS

One of the primary tasks in any rescue or recovery operation is to find the object to be recovered. There are several well established and proven search methods to choose from, depending on the location, depth, water condition and size of the object. Techniques and patterns that may work well for finding a gun thrown from a wharf may not be suitable for finding a body in the bay at ebb tide.

A successful search, like an investigation, requires patience, thoroughness, determination, a systematic procedure and attention to detail. It is essential that the initial search be thorough and systematic so as to avoid repeatedly covering the same area unnecessarily and to be able to document the search accurately.

Before a search can be initiated the dive team must establish a **LAST SEEN POINT (LSP)** and then mark the outer boundaries of the search area. The **LSP** will come from witness interviews, and physical evidence such as tire tracks, abandoned clothes, broken guard rails, oil slicks and floating debris.

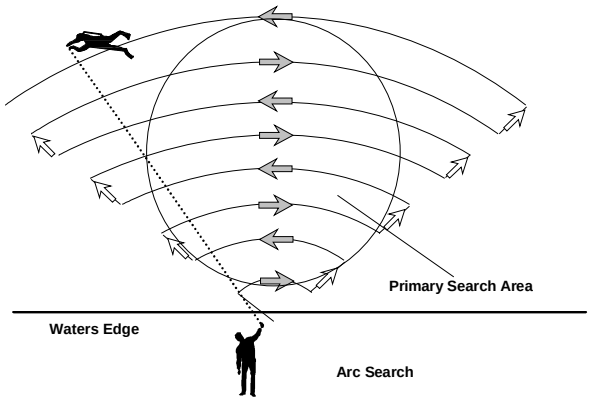
The outer boundaries of the search area will be dictated by the type of incident, the strength and direction of current, tidal movement, wind direction, water depth and the accuracy of the **LSP**. Conflicting stories or vagueness in the witnesses' statements may all contribute to a larger possible search area. This area should be marked and controlled during the search operation.

After initial surveys and interviews, the team leader will select the search method most suited to the location and the object to be found.

Shotgun Pattern

The shotgun or random pattern should only be utilized in near ideal conditions: good visibility, known area and high probability of success. The shotgun pattern consists of a series of random dives and irregular patterns that will hopefully bring the diver to the object. This may work for finding large objects in clear water but is considered the least professional and the hardest to document.

Arc Pattern



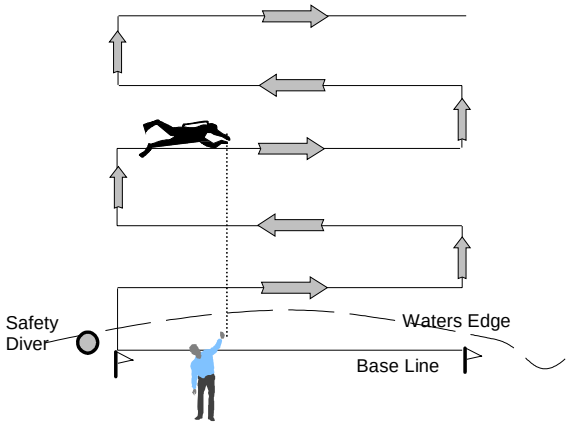
Also known as the fan pattern, the arc has proven itself on numerous occasions with agencies all over the United States. The arc pattern is generally used as a shoreline search (beach, lake or slow river) and consists of a diver swimming in increasingly larger arcs as he is tendered/controlled from the shoreline.

As the diver reaches one side of the arc, the tender gives a two-line signal, or if voice communications gear is used, gives a verbal command, lets out the appropriate amount of line and the diver continues in the opposite direction. The amount of line the tender lets out will depend on the size of the object and the visibility. Obviously a car can be found with larger arcs than a body. A modification of the arc pattern is the SNAG

search. With this the diver begins with considerable line and a large arc with the hope of snagging a large object such as a car or aircraft.

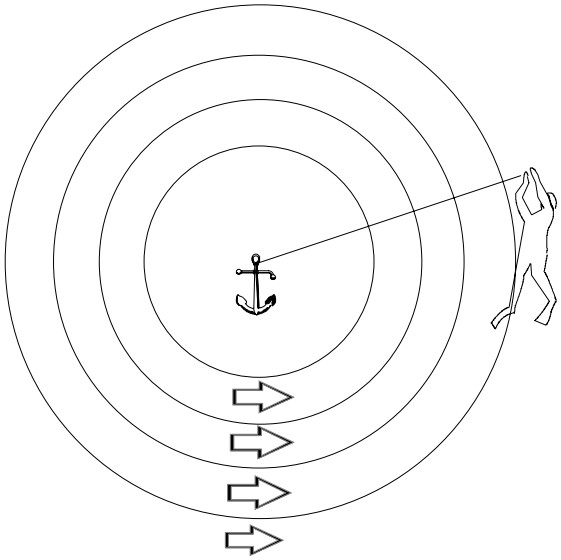
Parallel Pattern

The parallel pattern is another popular and effective shoreline search that can be used in both bays and ocean. The parallel search can be swum with a compass but is usually tended from the shore with a line. The diver swims parallel to the shore as the tender walks at the same speed holding the search line. When the boundary of the search is reached, the tender signals, lets out a few feet of line and reverses direction of the diver. This can continue as long as the diver has air and energy.



Parallel Search

Circular Pattern



Circle Search

The circular pattern has been credited with many successful finds in all areas of the diving industry. The circular pattern consists of the diver swimming a series of increasing circles, either tended from the surface, tended from the bottom by another diver or controlled by himself. Again the size of the circles and the amount of line let out each orbit will be dictated by visibility and the size of the object: two to three feet for a small object such as a gun, three to six feet for a body and six to ten feet for a car.

The clump weight for a marker buoy on the LSP is generally the center of the circle search. A 3/8" floating line makes the ideal sweep line and can be tied off to the object when it is found.

The circular pattern is best suited to mid-water searches where current and tides are not too strong (in SF Bay, diving operations may be delayed due to strong ebb and flood currents). The search can be swum by one diver with a standby safety diver on the

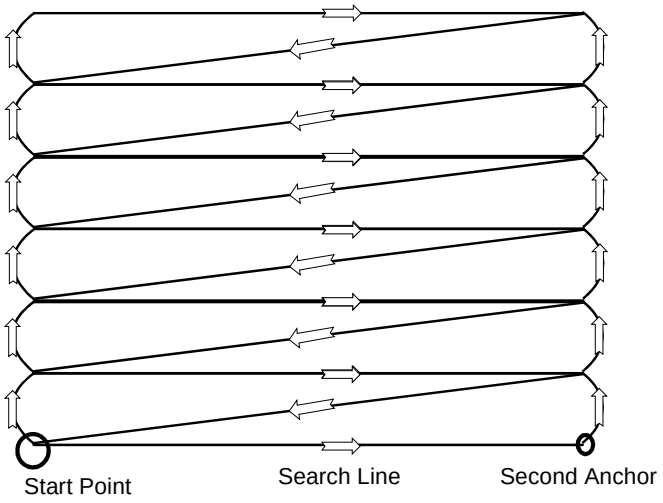
surface, or by two divers in a buddy pair. Remember, at times, two divers can get into each others way and stir up the bottom unnecessarily.

Linear Pattern

There are several variations of the linear search, but one that has been found to be very practical is the one frequently used by the NYPD SCUBA Unit. This pattern requires a length of rope (50-100 feet) with a clump or grapple on each end and a marker buoy coming up from one end. This pattern can be used in mid-water or as a shoreline search.

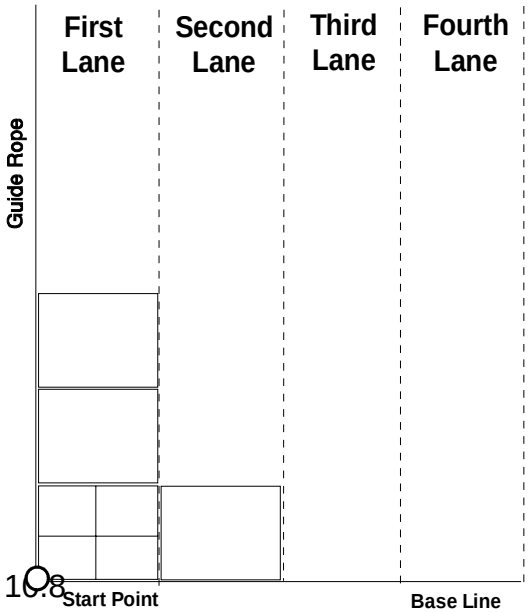
The clumbs are set on the bottom and the line pulled taut between them. The divers now search either side of the line until they come to the end. That end is moved in the direction of the search three to six feet and then swum in the opposite direction. At the end of each length the ends are moved creating a systemic crab like movement across the bottom.

The linear pattern is not tended from shore and is best suited to a fairly even bottom contour. When the divers have their time or are low on air, they can simply surface to be replaced by a fresh team. The marker buoy being the reference for their progress and the start point of the replacement teams.



LINEAR SEARCH

Grid Pattern.



Working the grid pattern is a slow and tedious task, but often the only effective way to find very small objects. The entire search area can be mapped out on the bottom with ropes or long poles, and then parallel lines are laid within the enclosed area. PVC frames are then used to thoroughly search a small 2-3 foot square area. When one grid is done, the frame is flipped into the next grid and it is searched. The grid pattern would be used to find a small object in a muddy/silty bottom in a very specific area.

Compass Searches

Compass navigation is a skill in itself and compass searches require practice and experience. The most effective compass search is done by a two-person team, one diver swimming the compass course and the other diver scanning the bottom for the object.

Hull & Structure Searches

Many times the SFFD dive team/Rescue Squads have been requested to check ship hulls for contraband by federal and local law enforcement officials. The dive team leader/IC must ensure that the ship's engines and steering gear are shut down, or at least out of gear. All water intakes and electronic equipment must be shut off and the ships captain or officer of the deck must be notified and assure compliance prior to diving operations. As an added safeguard a fire department officer should be stationed at the controls to make sure no engines, pumps or electronics are activated unknowingly.

Two divers can now systematically swim the hull, paying special attention to grates, intakes, recesses and the screw area(s), or a whole team can cover the hull in one sweep, connected with buddy lines or a search rope.

Before the divers enter the water they must be briefed on the procedure to follow if they find the object. There are several options, including, notify topside, do not touch; recover immediately; mark and return to the surface.

Arrangements should be made prior to the dive for an emergency recall/abort signal for the dive team.

PIPES AND SEWERS

San Francisco has a large sewer system, storm water drainage system and many industrial cooling pipes along the shoreline. The potential that a dive team may be required to enter these pipes/tunnels is ever present. There are several points that the team leader/IC must consider in this Risk/Benefit evaluation and pre-dive survey:

- Probability of victim's entry into the pipe
- Diameter and construction of the pipe
- Level of contamination - chemical or bacterial
- Flow rate in or out of pipe
- Length and depth of system
- Flood gate control
- Physical hazards such as rusty metal, broken concrete, etc.
- Possibility of primary diver rescue
- Needs/availability of special extraction equipment

Surface-supplied diving is, without a doubt, is the safest way to approach an u/w pipe rescue/recovery, and will be essential in the case of heavy contamination. If this is the case, a commercial diving company would be contracted. The next best option, and the quickest, in a confirmed rescue operation, would be SCUBA with surface communications, a strong safety rope and a second independent air source.

Fire Department SCUBA divers should not enter without a harness, safety line, preferably a braided rappelling/rescue rope, two u/w light sources, and an extra air source (Tank and Regulator). Keep in mind that there is no easy way out, no direct ascent to the surface, probably no visibility and usually not enough room to turn around - in head-first and out feet-first!

The separate tank may have to be pushed ahead or dragged behind if there is insufficient room to wear it. The safety diver should be equipped with an emergency an emergency air supply complete with a 5-6 foot hose between the first and second stages; this is to permit the second stage to be passed up past the entrapped diver's body to his mouth, as there may not be room for the tank.

Buoyancy compensators will be of little use and possibly a considerable hindrance. Backup lights and heavy gloves are essential. The rescue diver on SCUBA should use the cave divers "one-third rule", one-third of your air going in, one-third to come out, and one-third for emergencies and hang-ups.

COMMUNICATIONS/LINE PULL SIGNALS

The primary means of underwater communications is a hard wire diver-to-diver, diver-to-surface system. If the hard wire system should fail, or if more divers are required than the system can support, line pull signals must be used.

A line-pull signal consists of one or a series of sharp, distinct pulls on the line which are strong enough to be felt by the diver but not strong enough to pull the diver away from work. For a signal to be felt by the diver, all slack must be taken out of the line before the signal is given. The acknowledgment consists of replying with the same signal. If a signal is not properly returned by the diver, the signal should be resent from the surface,

A continued absence of confirmation must be assumed to be one of three things;

1. The line has become fouled
2. There is too much slack in the line
3. The diver is in trouble

If communications are lost, the Diving Supervisors must be notified, and action taken to identify the problem.

Line pull Signals

1 Pull	Diver to Tender	"In Position"
2 Pulls	Diver to Tender	"More Slack"
2 Pulls	Tender to Diver	"Change Direction"
3 Pulls	Diver to Tender	"Found Object"
3 Pulls	Tender to Diver	"Surface"
4 Pulls	Diver to Tender	"Help"

A second standby safety diver shall be staged on the surface immediately.

ALL EMERGENCY SIGNALS WILL BE ANSWERED BY THE TENDER !

HAZARDOUS MATERIALS DIVING

Hazardous materials which divers may be in contact with include, volatile fuels, heavy metals, toxic or corrosive chemicals or raw sewage. The SFFD has considerable expertise, training and experience in dealing with hazardous materials spills. This training can be utilized by dive teams that come in contact with, or are required to dive in contaminated waters. These contaminants can have a wide variety of effects on the divers ranging from skin irritation or infection to corrosion of equipment. The Department Hazardous Materials Team shall oversee the incident and provide support to the dive team.

The following is a list of dive sites that may endanger the health of a dive team:

- Bodies of water polluted by raw sewage and industrial waste
- Waters contaminated by toxic chemical dumping (Hunters Point Shipyard area)
- Beaches with sewage outfalls
- Harbors and docks in commercial ports
- Oil or chemical spills from tankers or other vessels
- Crash sites of aircraft
- Irrigation ditches contaminated by agricultural pesticides
- Sewage treatment plants and oxidation ponds (three in San Francisco)
- Waterways near dump sites

Equipment: The equipment selected for contaminated water diving will have the greatest impact on the health and safety of team members, equaled only by following strict procedures for diving and decontamination. The object of the exercise is to protect the diver from any physical contact with contaminated waters - not a drop should touch the diver's skin. The solution to this problem is a dry suit mated to a full helmet, with all seals water-tight, and the system run at positive pressure.

SAN FRANCISCO FIRE DEPARTMENT DIVERS WILL NOT OPERATE IN CONTAMINATED WATERS WITHOUT BEING EQUIPPED WITH A FULLY CONTAINED DRY SUIT AND SAFETY HARNESS TO ENSURE TOPSIDE CONTROL.

DIVING PROCEDURES

All diving in contaminated/polluted water must carry with them a Risk/Benefit Factor. That is to say, is it reasonable to risk a diver's health to achieve the objective?

If the operation is to proceed, then Contaminated Diving Procedures must be followed.

- Select a dive site that is up-wind of the contaminated area.
- The team should have an accurate evaluation of the hazard.
- Set up well clear of the waters edge, up-wind, up-current.
- All support personnel and tenders should have protective clothing on.
- All suit seals and helmet seal must be carefully checked.
- Run the dry suit on positive pressure, and light air flow in helmet.
- Any suit leaks will abort dive.
- The diver must be extremely careful around crash sites and sharp objects.
- Keep dives and bottom times short.
- All divers must go through a thorough decontamination procedure.
- Divers shall be monitored after dives for any evidence of illness or adverse reactions.

The proper department protocol shall be followed following a hazardous material exposure.

DECONTAMINATION PROCEDURE

The decontamination procedure is broken down into five areas.

1. The dressed-in diver as he leaves the water
2. The diving equipment
3. The undressed diver
4. Support equipment
5. Support personnel

As the diver leaves the water, he should be hosed down with uncontaminated water at a reasonable pressure, and then scrubbed down with a strong detergent solution. Use both large and small brushes to get into all areas of the suit and helmet.

At this point the weight belt and other external suit accessories can be removed, with the diver still on surface-supplied air, and a further decontamination is done with the

proper decontaminates. Before any suit seal is broken, the diver should be thoroughly rinsed down again with fresh water.

After the diver has undressed, the suit should be cleansed in a 50% by volume solution of chlorine bleach and water. After a final wash with soapy water and a fresh water rinse, the suit can be blotted dry and hung up at room temperature to finish the drying process. Valves must be disassembled and cleaned, along with weight belts, harness, bail-out, helmet, gloves, lights, tools, umbilical, etc.

Once dry, the suit should be stowed according to manufacturer's recommendations. The dry suit underwear must also be laundered according to manufacturer's instructions.

The diver should take a hot shower and thoroughly scrub his skin and scalp with an anti-bacterial cleanser. Special attention should be given to the ears to prevent otitis externa.

EQUIPMENT MAINTENANCE

Because of the harsh conditions in which most SFFD dive team operate including, salt water, sand, dirt, pollution and oil, equipment maintenance must be regular, routine and thorough. Dive equipment can be divided into two categories, life support equipment and additional less critical support equipment.

The life support equipment that requires the most attention would include:

- Regulators
- Tank valves
- Tanks
- Communication equipment/full face masks
- Wet suits and BC's
- Safety line and harnesses
- Weight belts and buckles

After each operational or training dive, all dive gear must be rinsed off in fresh water, washed in soapy water if necessary, treated with a non-toxic protective spray, and hung or laid out to dry. Repairs should be made, parts replaced as necessary.

Manufacturer's manuals should be consulted when cleaning or servicing regulators, valves, communications equipment and other special equipment or accessory. Captains shall be responsible for tracking hydrostatic testing of SCUBA tanks.

Procedures for replacing underwater equipment change from time to time, therefore Rescue Company Captains shall utilize the current in-place procedures to request repair and/or replacement of equipment.

CONCLUSION

Safe diving is the goal of all SFFD divers. Your contribution through constructive criticism of this Training Bulletin and recommendation for changes is vital to that end. Comments should be directed to the Division of Training, In-Service Training. Be specific and provide sufficient information to substantiate the comments.

SECTION 11. RESCUE VS. BODY RECOVERY

Earlier in this manual, there was a paragraph which dealt with the importance of establishing the exact time that the victim was subjected to the drowning process. Due to the advantage of cold water drowning, there is a probability that life can be restored providing certain criteria is met. If the victim can be rescued within the guideline of "The Golden Hour", there is a chance that life can be restored. It is important that responding companies perform all tasks as quickly as safety will permit. Water Rescue Team members shall make every attempt to arrive suited up and ready to deploy. This includes making mental and emotional adjustments prior to your arrival. You should begin to think about the location and its inherent hazards and conditions. Make a mental note of the equipment that you will be using and the alternative that may call for a different approach so to minimize any time lag.

It is very important that our decisions are based on facts and probabilities and not emotion. The age of the victim shall not have any bearing on your decision. Only the natural conditions, ability level of the rescuer, and availability of other means of rescue are the relative factors that should be considered. An eight foot wave slamming against the rocks at Land's End is as life threatening to a rescuer as it is to the victim.

No matter how noble the attempt may seem, it is important not to overlook the fact that SAFETY is always the most important consideration. It is not encouraged by the Water Rescue Team that rescuers take any initiative that may place them into a more precarious position than that dictated by the situation. Rescuers must consider their own safety as the first priority on any rescue incident. **Don't become a victim.**

MEDIA

A water rescue will usually generate widespread media coverage. It is important that you conduct yourself in a professional manner at all times; your words and actions may be captured on camera. A member of the Fire Department, who is familiar with the rescue and the Water Rescue Program, shall be appointed by the Incident Commander as the spokesperson and will give out information to the news media. All others shall not comment or converse with members of the media. Excuse yourself as diplomatically as is possible. What you say "off the record" may end up being quoted. Tactics for the rescue shall be discussed in private and away from the cameras. Name(s) of the victim(s) shall not be released. Be aware that there may be family members within earshot of your conversation. Your compassion and conduct may lessen the impact of their tragedy.

PROCEDURE REFERENCE GUIDE

The normal responding companies to a water rescue have been issued copies of a "pocket" procedure guide. The purpose of these is to have a concise, quick, easy to read reference guide to remind and guide the user through the important steps that need to be addressed while responding or arriving at an incident. They will be continually updated and replaced as different standards of operating procedure are established by the Water Rescue Committee. The copies are printed on plastic laminated high-impact color paper. It was determined at the time of inception that this guide should not take longer than two minute to read in its entirety. It has been written so that the index is located on the left column and the right side provides the text of the specific action.

With the copy of the Procedure Guide, the normally responding water rescue companies have also been provided with two other guides. One is reference for the Beach Commander (operations) and the other is for the Incident Commander. They were set up as a checklist of procedures that should be accomplished, under most circumstances, in chronological order. They are self explanatory.

SECTION 12. APPENDICES

APPENDIX A: WATER RESCUE COURSE AND REQUIREMENTS

The San Francisco Fire Department Water Rescue Team Committee has established a course outline to meet the needs of the program. In order to perform under the adverse conditions of our ocean areas, it was decided that we would adopt the standards as stated in the American Red Cross Lifeguard Course. Those who pass this phase will be considered "Department Swimmers." Those who want to continue training, and be classified as "Water Rescue Team Members," will be expected to perform their newly acquired rescue techniques while subjected to the ocean conditions at China and Ocean Beach.

The following is a brief overview of the course content and requirements for Water Rescue Team Members: There are two phases, phase 1 pool work, and phase 2 ocean work.

In a pool, swim a distance of 400 yard in 12 minutes using accepted strokes in lifesaving as defined by the American Red Cross. Note: Fins will not be allowed for this portion.

- Crawl Stroke
- Breast Stroke
- Side Stroke (Scissors/Inverted Scissors kick)
- Back Stroke

Demonstrate the following techniques and evolutions as defined by the Red Cross

Entries

Water Entry

Stride Jump
Feet First Entry
Ease-in Entry

Beach Entry Technique

Shallow Water Dive Entry

Victim Level Off (Carry)

Carries

Hair Carry
Cross Chest
Tired Swimmer Carry
One (Rescuer) Person
Two (Rescuer) Person
Wrist Tow
Front & Back Assist

Rescue Equipment Use

Ring Buoy
Throw Bag
Rescue Tube (Peterson Buoy)
Rescue Buoy
Rescue Lifeline
Boogie Board

Demonstrate basic rescues using appropriate rescue equipment in a swimming pool.

The second phase will be the performance of water rescues under ocean conditions. Additional training will be given on the equipment carried on the Surf Rescue Unit. Further instruction will be conducted by the GGNRA Rangers on the tidal conditions, use of the Inflatable boat, and ocean condition awareness.

APPENDIX B: BEAUFORT WIND SCALE (USED IN MARINE FORECASTING)

Force	Wind in Knots	Description	Open Sea Wave Ht (ft)
0	< 1	Glassy sea; smoke rises vertically	0
1	1 - 3	Small ripples	0
2	4 - 6	Light breeze; wavelets	1
3	7 - 10	Gentle breeze, occasional wavelet break	2.5
4	11 - 16	Moderate breeze, long waves break crest	3.5
5	17 - 21	Fresh breeze, long breaking crests	5
6	22 - 27	Strong breeze, large waves	10
7	28 - 33	Near gale, sea heaps up, white form	13
8	34 - 40	Gale, longer, higher waves, spindrift	18
9	41 - 47	Strong gale, high waves, streaky foam	22
10	48 - 55	Storm, very high waves, sea white	30
11	56 - 63	Violent storm, huge waves, poor visibility	36
12	64 +	Hurricane, air full of foam and spray	45

APPENDIX C: RESCUE WATER CRAFT/ RESCUE BOAT SOG'S

INTRODUCTION

This appendix covers all policies and procedures for SFFD Rescue Watercraft (RWC) and Rescue Boat Operations. This SOG l is compliant with local, state, and federal regulations regarding PWC and small boat operations.

MISSION STATEMENT

To provide marine safety and rescue services through the use of Personal Watercraft (PWC) and small boats staffed with SFFD water rescue personnel; to save lives and property by providing Search and Rescue and Emergency Medical Services for boaters, windsurfer's, surfers, swimmers; or other persons on or near San Francisco's waterways; and to provide marine safety, rescue, and EMS services on the water for special events within the San Francisco Bay Region.

PURPOSE

The Rescue Water Craft / Rescue Boat Operation Guidelines

The purpose of these rescue boat operation guidelines is to ensure that all SFFD rescue water craft and rescue boat operations are conducted in a manner that maximizes protection of SFFD rescue boat crewmembers from accidental injury or exposure to hazards. Minimal guidelines are defined for the command and control of SFFD RWC and rescue boat operations. In addition, this document sets forth guidelines for training and certification of rescue water craft / rescue boat operators and crewmembers. This document has been developed and written by adapting the guidelines set forth by the United States Coast Guard (USCG), National Fire Protection Association (NFPA), and the California Department of Boating and Waterways (DBW).

Review of Guidelines

An annual report and review of RWC and rescue boat operations will be prepared and submitted by the SFFD Chief of Special Operations to the Chief of Department. At this time, any recommendations for modifications of these guidelines should be submitted to the SFFD Chief of Special Operations for consideration.

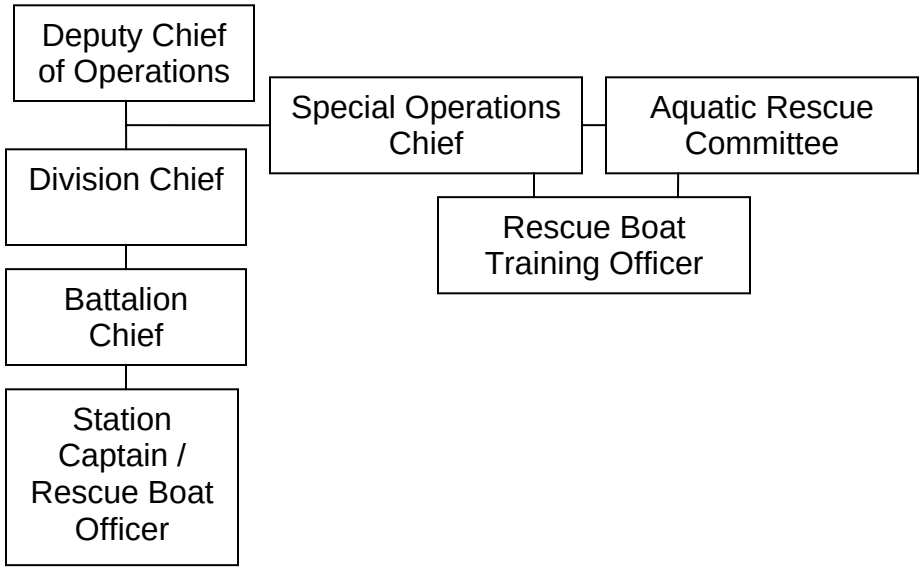
SCOPE

The following guidelines are to be utilized by all SFFD members involved in rescue boat operations.

TABLE OF ORGANIZATION AND EQUIPMENT

RWC/Rescue Boat Chain of Command

The RWC/rescue boat operator (coxswain), while underway, is in charge and responsible for the safe operations of the vessel and crew at all times. The rescue boat operator will report through the above chain of command.



Communications

SFFD RWC and rescue boats can and will receive information and direction from ECD, USCG, Incident Commanders, and Event Coordinators.
While underway SFFD rescue boats will monitor and communicate via the assigned 800mhz control channel, VHF-FM Marine Channel 16, and VHF-FM Marine Channel 21A. Upon the arrival on scene of an incident or special event the rescue boat will also monitor and communicate on the assigned 800mhz or marine tactical channel. SFFD RWC can only monitor one frequency while underway and will monitor the designated channel by the IC or ECD.

Equipment

All rescue boat equipment used by RWC/rescue boat operators, rescue boat crewmembers, trainees, or individuals detailed to be on the vessels, regardless of ownership, shall conform to the standards set forth in this document.

Personal Protective and Rescue Equipment

PFD (Personal Floatation Device): A USCG approved PFD shall be worn at all times by anyone on board a SFFD RWC or boat. Whistle, Rescue Knife, Strobe Light, Chem Light, and Signal Mirror will be attached or concealed in a pocket of the PFD.

Wetsuit, Gloves, Booties, Fins, and Belt: In addition to the PFD these items are required PPE for all Rescue Swimmers. A dry suit may be used in place of a wetsuit.

Helmet and Eye Protection: Required PPE for RWC operators. Also required for boat crew during helicopter operations.

Other Equipment

VHF-FM Marine Radio: A marine radio will be monitored at all times while underway. VHF-FM Channel 16 and 21A will be monitored when vessel is not assigned to other frequencies. RWC are not required to monitor a marine radio while underway.

Fire Department 800MHz Radio: A SFFD radio will be carried and monitored at all times by RWC and Rescue Boat operators.

Peterson Rescue Tube: Rescue Boat will carry two (2) Peterson Tubes. RWC will carry one (1).

Rescue Rope Throw Bag: Rescue Boat will carry 3 50' throw bags. RWC will carry one.

EMS Equipment: Rescue Boat will carry an EMS Kit that will include BLS and ALS gear. Defib and C-Spine Equipment. Miller Board and Stokes with Flotation. RWC will carry an EMS Kit that will include a pocket mask, scissors, wound packs, tape, medical gloves/facemask, and c-collars.

Tow Line: Rescue Boat will carry a minimum of 100' of ½"or greater double braided rope attached to tow reel or stored in rope bag. (Assorted shackles should be available to attach tow line.)

Mooring Lines: Rescue Boat will carry a minimum of 5 10' double braided nylon mooring lines.

Fenders: Rescue boat will carry a minimum of two fenders. (Bumpers)

Flashlights: Rescue boat will carry a minimum of two handheld flashlights.

RWC Rescue Board. Rescue boards will remain attached to the vessels. They may be removed for operational needs but should be reattached immediately at the end of that operational period.

Certification Types

The San Francisco Fire Department requires that any member who engages in rescue boat or RWC operations hold a certification as a boat operator or crewmember or RWC operator issued by the designated RWC/rescue boat training officer. SFFD recognized certifications are:

1. SFFD rescue boat crewmember course completion certification.
2. SFFD rescue boat operator course completion certification.
3. SFFD RWC operator course completion certification.

Staffing

SFFD rescue boats will be staffed with a minimum crew that consists of an operator and crewmember. SFFD RWC will be staffed with one or two operators. All RWC/rescue boat crewmembers and operators will be SFFD certified in the specific position they are filling, along with holding a valid EMT license and rescue swimmer certification.

INSTRUCTIONAL PERSONNEL

Instructor Qualifications

All personnel involved in rescue boat crewmember or operator instruction under the auspices of the San Francisco Fire Department shall be qualified for the type of instruction being given. RWC operator instructors must be SFFD certified RWC operators with a minimum of 100 hours of underway experience. Rescue boat crewmember instructors must be SFFD certified rescue boat crewmembers with a minimum of 100 hours of underway experience. Rescue boat operator instructors must be SFFD certified rescue boat operators with a minimum of 300 hours of underway operator experience. (50 of the hours must be night operations)

Selection of Instructors

Upon successfully meeting the minimum qualifications SFFD rescue boat instructor applicants will be screened and selected by a selection panel

comprised of the chief of special operations, the aquatic rescue committee, and the rescue boat training officer.

RESCUE WATER CRAFT/RESCUE BOAT REGULATIONS

DAILY RWC/RESCUE BOAT RESPONSIBILITIES

RWC Daily Operational Inspection

Fuel / Oil: RWC fuel level must always be above ¾ of a tank before and after each use.

- Oil level should be checked daily and filled if needed.
- (Unleaded fuel / manufacture recommended oil)

Steering: Check steering by turning the helm fully in each direction. Steering should be smooth without any play. Visualize jet drives as the helm is turned to be sure it is operating correctly.

Throttle: Fully depress and release the throttle. Operation should be smooth and throttle should release fully back to its original position.
Engine Compartment: Remove engine cover and inspect compartment. Look for any loose connections or leaks. Inspect spark plug and battery connections. Wipe down dirt and grease spots. Wash engine compartment with fresh water after every use. Flush internal areas with flush kit (fresh water) after every use.

Battery: To insure the battery is fully charged push the start button. The motor should turn over rapidly without hesitation. If you have a battery tester apply it to check the system. Charge and replace battery as needed.

Troubleshooting Minor Problems: The PWC owner / operator manual will give specific information to troubleshooting minor problems with your vessel. Any other repair must be preformed by an authorized mechanic. BOE notification is required.

Engine Test: Attach lanyard and start motor with flush kit attached or with vessel in the water. Re-check engine compartment for loose fittings and leaks.

Walk Around: Inspect the whole vessel for damage and cleanliness. Inspect intake and nozzle for debris and damage. Insure drain plug is in place.

Storage: Vessels should always be covered when not in use. Trailers should be checked periodically. See owner's manual for proper tire pressure. Vessel

deployment dock should be checked weekly for debris and damage. Insure dock is properly secured.

Rescue Boat Daily Operational Inspection

Fuel / Oil: Rescue Boat fuel level must always be above ¾ of a tank before and after each use.

Oil level should be checked daily and filled if needed.
(Unleaded fuel / manufacture recommended oil)

Walk Around: Inspect the whole vessel for damage and cleanliness. Inspect propellers for damage.

Engines: Look for any loose connections or leaks. Wipe down dirt and grease spots. Wash engine exterior with fresh water after every use. Flush internal areas with flush kit (fresh water) after every use.

Electronics: Check all lights, horn, radios, radar, GPS, and sonar.

Engine Test: Attach lanyard and start motor with flush kit attached or with vessel in the water. Re-check engine compartment for loose fittings and leaks.

Steering: Check steering by turning the helm fully in each direction. Steering should be smooth without any play. (Engines must be running to check steering)

Transmission / Throttle: Check port and starboard controls. Shift into reverse, forward, and neutral. Press the throttle only button and check the throttle. (Engines must be running to check transmission and throttle)

Rescue and EMS Gear: Check all rescue and EMS equipment.

Troubleshooting Minor Problems: The vessels owner / operator manual will give specific information to troubleshooting minor problems with your vessel. Any other repair must be preformed by an authorized mechanic. BOE notification is required.

Storage: Vessels should always be covered when not in use. Shore tie must be attached and battery switches should be in the off position. Trailers should be checked periodically. See owner's manual for proper tire pressure. Vessel deployment dock should be checked weekly for debris and damage. Insure dock is properly secured.

RWC/Rescue Boat Officer Daily Tasks

All officers assigned to stations with RWC or rescue boats will ensure the following tasks are completed by 0830 daily.

1. Receive briefing from off going officer and boat operator.
2. Assign operator and crewmember positions.
3. Make notifications to BC and ECD to include the following:
   - •In service or Out of service (give reason for out of service)
   - •ALS or BLS staffing
4. Review journal and detail notices for training and special events updates.
5. Ensure tide and weather information is posted.

RWC/Rescue Boat Operator Daily Tasks

Members that are assigned as rescue boat operators will ensure the following tasks are completed daily.

1. Receive briefing from off going officer and boat operator.
2. Assign crewmember positions.
3. Complete daily vessel inspection and brief company officer.
4. Assist company officer as needed.

Rescue Boat Crew Member Daily Tasks

Members that are assigned as rescue boat crewmembers will ensure the following tasks are completed daily.

1. Receive briefing from off going crewmembers.
2. Place personal rescue swimmer PPE on the boat and ensure it is ready for use.
3. Check all rescue and EMS equipment.
4. Assist operator as needed.

GENERAL INFORMATION

NAVIGATION / RULES OF THE ROAD

Aids to Navigation (ATON)

Buoys: All buoys float. You will come across three types of buoys: navigational, mooring, and fishing. Mooring buoys are used to tie a boat to. Never tie a boat to a navigational buoy, it is against the law. Fishing buoys are usually used to mark fishing nets, crab traps etc. One should try to avoid these. They usually indicate

shallow water and their line may foul (get caught in) your prop or jet, especially if you are under power.

Navigational buoys are used as an aid in navigating your boat. Green buoys have odd numbers. To the right is a lighted green buoy (with seals) and an unlighted green buoy with a flat top, also called a can. When returning from sea these buoys should be kept to port. (IALA-B International Maritime Buoyage System)

Red buoys have even numbers. To the right is a lighted red buoy (with seals) and an unlighted red buoy with a pointed top, also called a nun. When returning from sea these buoys should be kept to starboard. (IALA-B International Maritime Buoyage System)

Mid channel markers are red and white or black and white and are marked with a letter and topped with a round ball. The light color is white and the flash pattern is Morse "Alpha". (- ---)

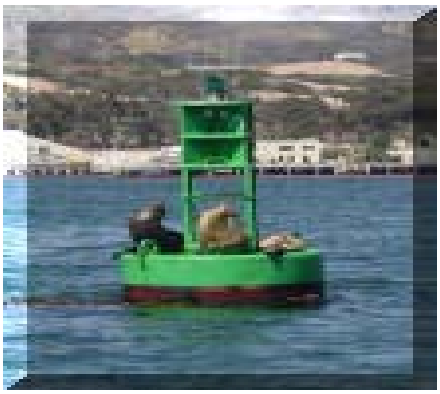
Preferred channel markers are buoys that are colored red and green. This ATON means it is safe to pass on either side of the buoy but the preferred channel is in reference to the top color of the buoy. The light color can be red or green and the flash pattern is occulting. (- - ---)

Daymarks: All daymarks are on pilings and are numbered. Red daymarks have even numbers and are triangular. Green daymarks have odd numbers and are square. Daymarks have the same meaning as buoys but are placed in shallower water. If you are trying to stay within a channel, never maneuver your vessel between two buoys or daymarks that have the same color.

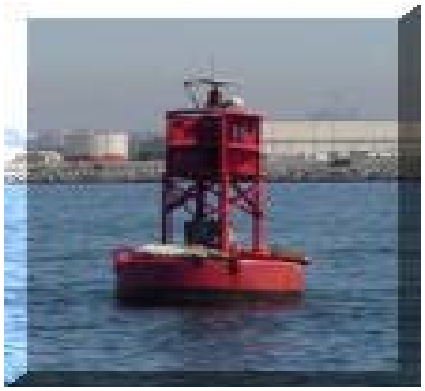
Dayboard

Dayboard

Green "Can" Buoy



Green Lighted Buoy



Red "Nun" Buoy

Red Lighted Buoy

Using the Aids to Navigation or ATON listed above along with landmarks around the bay will allow RWC and Rescue Boat operators to safely navigate the area. Nautical charts are very useful tools to preplan and safely navigate your way to an incident.

Navigation Signals

The law prescribes signals for vessels in sight of each other to indicate the intended course of a vessel when necessary for safe navigation.

- One short blast (1 second) of the horn or whistle will show an intention to direct course of vessel to own starboard (right).
- Two short blasts will show intention to direct course of vessel to own port (left).
- Three short blasts will indicate the vessel's engines are going astern (in reverse).
- Five or more short and rapid blasts is a danger signal used when the other vessel's intentions are not understood or where the other vessel's indicated course is dangerous.

- Prolonged blast (4 to 6 seconds) will indicate situations of restricted visibility. See Fog Signals.

Motorboats should not use cross signals, that is, answering one blast with two blasts or two blasts with one blast.

Rules of the Road

Steering and Sailing Rules

Whenever two vessels on the water meet one another, one vessel has the right-of-way; it is called the "stand-on" vessel. The vessel which does not have the right-of-way is called the "give-way" of "burdened" vessel.

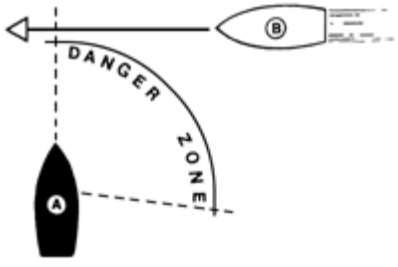
The vessel with the right-of-way has the duty to continue its course and speed, except to avoid an immediate collision. When you maintain your direction and speed, the other vessel will be able to determine how best to avoid you.

The vessel which does not have the right-of-way has the duty to take positive and timely action to stay out of the way of the Stand-On vessel. Normally, you should not cross in front of the vessel with the right-of-way. You should slow down or change directions briefly and pass behind the other vessel. You should always move in such a way that the operator of the other vessel can see what you are doing.

Rules When Encountering Vessels

There are three main situations that you may encounter with other vessels which could lead to a collision unless the Steering Rules are followed:

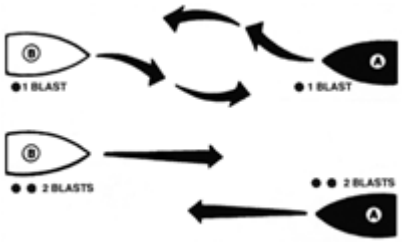
- **Meeting**: you are approaching another vessel head-on
- **Crossing**: you are traveling across the path of another vessel
- **Overtaking**: you are passing or being passed by another vessel



When Crossing: Every boat has a "Danger Zone" from straight in front (the bow) to past the middle of its right side. Like when meeting another car at a street intersection, the one on the right has the right of way. You must yield to boats in your Danger Zone. If you are the skipper of the Vessel A in the center of the diagram, you must keep out of the way of any boat that approaches you from any direction within the indicated Danger Zone, as you are the burdened craft. Likewise, boats approaching you from all other directions, except the meeting vessel, must keep clear of you.

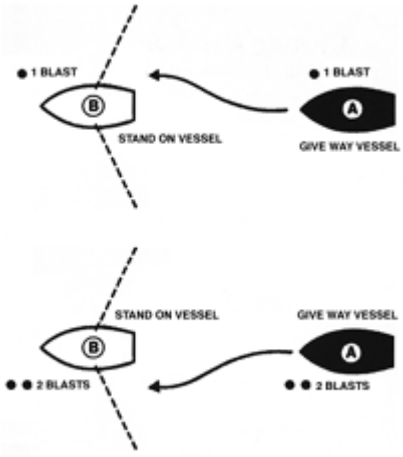
When Meeting Port-to-Port: Continue on course. The same holds true for meeting starboard-to-starboard.

When Meeting Head On: As in a car, both stay to your right and as far apart as practical. Each boat should turn to starboard and pass port-to-port.



When Overtaking Another Boat: The boat being overtaken is the privileged vessel. Only after signaling and receiving an acknowledgment can the overtaking boat pass. (Use on blast to pass on the right, and two blasts to pass on the left.

When Being Overtaken: Be ready for trouble when a power boat passes you in a narrow waterway. As the lead boat, which always has the right of way, stay on your side of the channel and maintain a steady speed so that the overtaking vessel can pass you safely. Use your radio to discuss this with the passing boat.



Power Boats must yield to Sailboats and boats being rowed or paddled, except in a narrow channel. Stay well clear of all large vessels.

<u>Other Situations:</u>

- A boat nearing a bend in a channel where vessels approaching from the other direction cannot be seen shall signal with a prolonged blast (four to six seconds), which shall be answered with the same signal by any approaching boat within hearing. Should such signal be answered by a boat on the farther side of the bend, then usual signals for meeting and passing shall be given upon sighting. If the signal is unanswered, the channel may be considered clear.
- Boats shall keep to the starboard side of narrow channels whenever safe and practicable.
- Motorboats leaving a dock or berth shall sound one prolonged blast.
- Motorboats shall keep out of the way of sailing vessels where courses involve the risk of collision.
- In narrow channels, do not hamper the safe passage of vessels, such as deep-draft liners and freighters, which can navigate only inside such channels.

Nothing in the rules of the road shall exonerate the operator of a vessel from the consequences of neglecting to comply with the inland rules of the road, or from neglecting any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

In construing and complying with the inland rules of the road, due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from the rules of the road necessary to avoid immediate danger.

MARINE COMMUNICATIONS

VHF-FM Marine Radio

A marine radio is a must have piece of equipment for marine rescue operations. The marine radio allows rescuers to communicate with other vessels and the USCG during rescue operations.

Marine Radio Operation

- First turn on the radio and select the channel you are assigned to operate on.
- To transmit, key the microphone and speak in a clear monotone voice.
- To hail a vessel or station say the name of the station you are calling twice followed by your unit identifier once and the channel you are on.
- End the transmission with the word "over".
  Example: *Coast Guard Station Golden Gate, Coast Guard Station Golden Gate, This is SF Rescue Watercraft 1 on Channel 22 Alfa Over*
- The station you are hailing will reply by calling your call sign once followed by their call sign once followed with "go ahead over".
  Example: *SF Rescue Watercraft 1, this is Coast Guard Station Golden Gate go ahead over.*
- Once initial communications are established you can shorten station identifiers to make communications easier.
  Example: *Station, watercraft 1, over. Watercraft 1, station, go ahead over. Station, watercraft 1, we are responding to the incident at pier 39 with two POB with a 4 minute ETA, how copy over. Watercraft 1, station, roger good copy out.*
- All transmissions that do not require a reply end with the word "out".
- Channels 21A, 22A, 23A, 81Aand 83A are used for USCG / Fire operations.
- There are several marine channels that are restricted for specialized uses. (See appendix C)

Marine Radio Terminology

- **Over—**Used at the end of a transmission requiring a reply.
- **Out—**Used at the end of a transmission not requiring a reply.

- **Copy—**I understand the message
- **Roger—**Yes
- **Wilco—**Yes I will comply with the message

Access to Marine Radio Frequencies

SFFD land based units not equipped with marine radios may communicate on marine frequencies using the following methods:

- The handheld Bendix King radios have marine channels 16, 21A, 22A, and 83A programmed for use.
- The Kenwood mutual aid radios have various marine channels programmed for use.
- The SFFD 800 MHz radio system can patch into a marine frequency for use.

SF BAY OVERVIEW AND INFORMATION

Weather Forecasts

Forecast as of 9:00 am PDT on September 20, 2007

San Francisco San Pablo Suisun Bay and The West Delta-
Small Craft Advisory through tonight

Today	SW winds 5 to 15 kt...except locally 15 to 25 kt with gusts to 30 kt near the Golden Gate. A slight chance of thunderstorms.
Tonight	SW winds 5 to 15 kt...except locally 15 to 25 kt with gusts to 30 kt near the Golden Gate. A slight chance of thunderstorms.
Wed Through Thu	W winds 5 to 15 kt...increasing to 15 to 25 kt during the afternoon and evening hours.
Fri and Sat	W winds 5 to 15 kt...increasing to 15 to 25 kt in the afternoon.

SF Bay weather is a constantly changing mix of various conditions that can and will have an effect on RWC and Rescue Boat operations.

Wind: SF Bay has some sort of wind every day of the year. Wind causes water conditions to become choppy. The term wind wave is used in describing the size of the seas caused from windy conditions. It is important to understand the effect wind has on bay conditions as well as effecting the operations of your vessel.

Fog: Fog is a normal sight on our bay. RWC and Rescue Boats that are not equipped with radar or GPS systems will not operate in heavy fog conditions. The minimum visibility for SFFD Rescue Boat operations is **200ft**. When operating in restricted visibility conditions keep you vessel as a safe speed and listen for fog signals from other vessels and ATON.

Air Temperature: Average bay temperatures usually run on the cool side. Proper protective clothing should always be worn to deal with UV and thermal protection.

Water Temperature: SF bay water temperature remains around 50 – 60 F year around.

Weather Board: A daily forecast should always be posted on the weather board. This will give the Rescue Boat crew much needed information on what conditions to expect while underway.

Tides and Current

The narrow opening that connects the bay with the open ocean in conjunction with the tidal changes that occur daily create currents up to 7 knots.

Tides are created from the gravitational pull of the earth along with the current lunar cycle.

Tides: Tides change twice every 12 hours. High and Low.

- An incoming tide (flood tide) occurs when the tide is rising.
- An outgoing tide (ebb tide) occurs when the tide is falling.
- Slack tide occurs at the top and bottom of each cycle when there is no tidal movement.

Current: Current is created by the large volume of water that is displaced with the tidal movement. As tides move in and out of the bay it is important to know the direction of current. Wind can also cause current. Current speed and direction are important when creating an incident action plan and developing search grids. RWC and rescue boat operations in current (dynamic water) will be covered in section 5 of this manual.

Commercial Vessel Traffic

San Francisco Bay is one of the busiest commercial seaports on the west coast. From tug boats to container ships SF Bay plays host to every aspect of the maritime industry. Every year thousands of ships pass through the Golden Gate and transit the bay. SF Bay commercial vessel traffic is controlled and monitored by the US Coast Guard Vessel Traffic Service (VTS) located on YBI. Vessels are controlled and monitored just as aircraft are at an airport or in the air. Along with the overwhelming amount of goods and products that arrive by commercial vessels every year comes the large number of passengers that are traveling into San Francisco via cruise ship and ferries. According to the Port of San Francisco the following statistics were gathered:

Cruise Ships: 137,315 passengers disembarked, transited, and embarked in S.F. (2007). Currently there are around 70+ cruise ships scheduled to arrive in S.F. this year. (2007)

Ferry Vessels: It is estimated that 4-10 million passengers use ferries on SF Bay every year.

City Front Property and Pier Use

The city waterfront and piers are home to restaurants, businesses, commercial vessel services, ship terminals, dry docks / ship yards, commercial fishing and processing services, parks, beaches, etc. On any given day our waterfront areas handle large numbers of people. Fisherman's Wharf, Pier 39, The Embarcadero, SBC Park, Alcatraz Is., Golden Gate Bridge, Treasure Island Overlook to SF, Embarcadero Center, Ferry Building, and Pier 35. San Francisco also plays hosts to several special events every year attracting huge crowds to the waterfront areas. Fourth of July Celebration, New Years Eve Celebration, Fleet

Week, KFOG Kaboom, Pier 32 Concerts, Tall Ship Parade, Opening Day on the Bay, The X-Games, and The SF Grand Prix just to name a few. Port and bridge construction projects on the water expose a hazard for construction workers that rely on our services in the event of an emergency.

Aircraft Use

Every aircraft arriving and departing from Oakland and San Francisco International Airports transits over San Francisco Bay waterways. On average 1500 flights arrive and depart from the two airports every day.

Hazards

There are numerous hazards on and around the bay that can and will have an effect on rescue boat operations. Operators shall always keep a sharp lookout and avoid hazardous conditions that could cause personal injury or damage to your vessel.
Common hazards to look for:

1. Floating debris of all sizes is in abundance all over the bay.
2. Submerged pilings and pier structures.
3. Protruding objects under piers.
4. Shallow areas.
5. Ferry Landings with heavy vessel traffic.
6. Wildlife.
7. Large wakes from other vessels.
8. Large waves and choppy seas caused from bad weather.

RWC and rescue boat operators can preplan and identify hazards before an incident happens. A good way to chart hazards is to inspect areas at low tide. A majority of exposed hazards are covered or submerged during high tide.

MUTUAL AID / JOINT OPERATIONS

United States Coast Guard (USCG)

All bay area U.S. Coast Guard stations and units are under the direction of Coast Guard Sector San Francisco located at YBI. Sector San Francisco is in operation 24hrs a day and coordinates all bay area Coast Guard missions. Sector SF is also responsible for outside agency communications and information sharing.

1. **USCG Sector SF**
   Location: YBI
   3 87' patrol boats are stationed at Sector SF
2. **USCG Station SF**

Location YBI
3 41' Utility boats
3 25' RBS (response boat small)

3. **USCG Station Golden Gate**
   Location: Ft. Baker Under north end of GG Bridge.
   2 47' Motor Life Boats
   2 25' RBS
4. **USCG Station Vallejo**
   Location: Napa River just south of the Mare Island Bridge
   1 41' Utility boat
   2 25' RBS
5. **USCG Air Station SF**
   Location: SFO
   4 HH-65 Helicopters


41' UTB


25' RBS


87' Patrol Boat


HH-65


47' MLB

<u>San Francisco Police Department</u>

SFPD Marine Unit
Location: Hyde Street Commercial Fishing Harbor
1 47' Motor Life Boat
1 31' Safe Boat
1 21' RHIB
2 PWC's (personal water craft)

<u>Southern Marin Fire Department</u>

Fire / Rescue Boat "Liberty"
Location: Sausalito Marina
Paramedic Staffed

South San Francisco Fire Department

Marine Rescue Unit

Location: Oyster Point Marina
1 23' Safe Boat
Paramedic Staffed

Oakland Fire Department

Marine Rescue Unit

Location: Jack London Square
1 55' Fireboat (not in service)
1 21' RHIB (Rigid Hull Inflatable Boat)
1 Type 3 swift water task force with 2 IRB's (Inflatable Rubber Boat)

Alameda County Sheriff Department

ALCO Marine Unit

Location: Oakland Estuary
1 85' Patrol Boat
1 31' Safe Boat
2 PWC's

Tiburon Fire Department

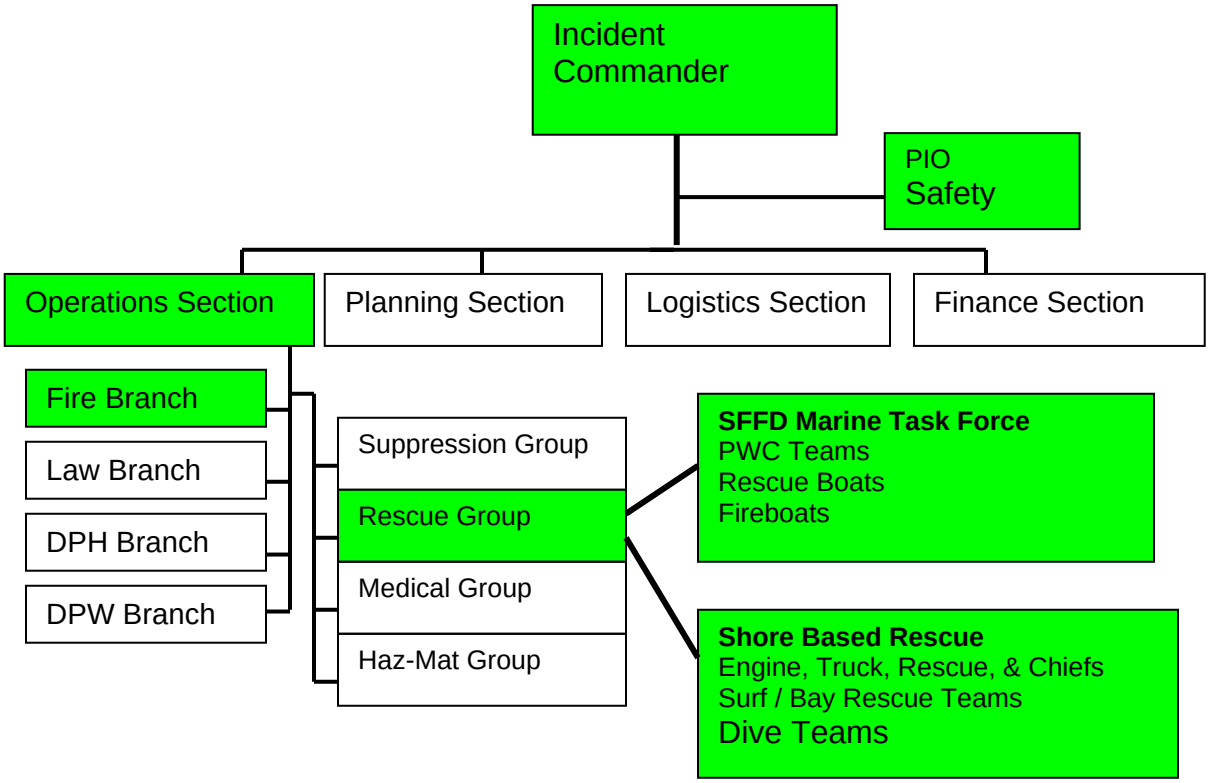
Marine Rescue / Fireboat

Location: Tiburon Yacht Harbor
1 34' Fire / Rescue Boat

NATIONAL INCIDENT MANAGEMENT SYSTEM (NIMS)

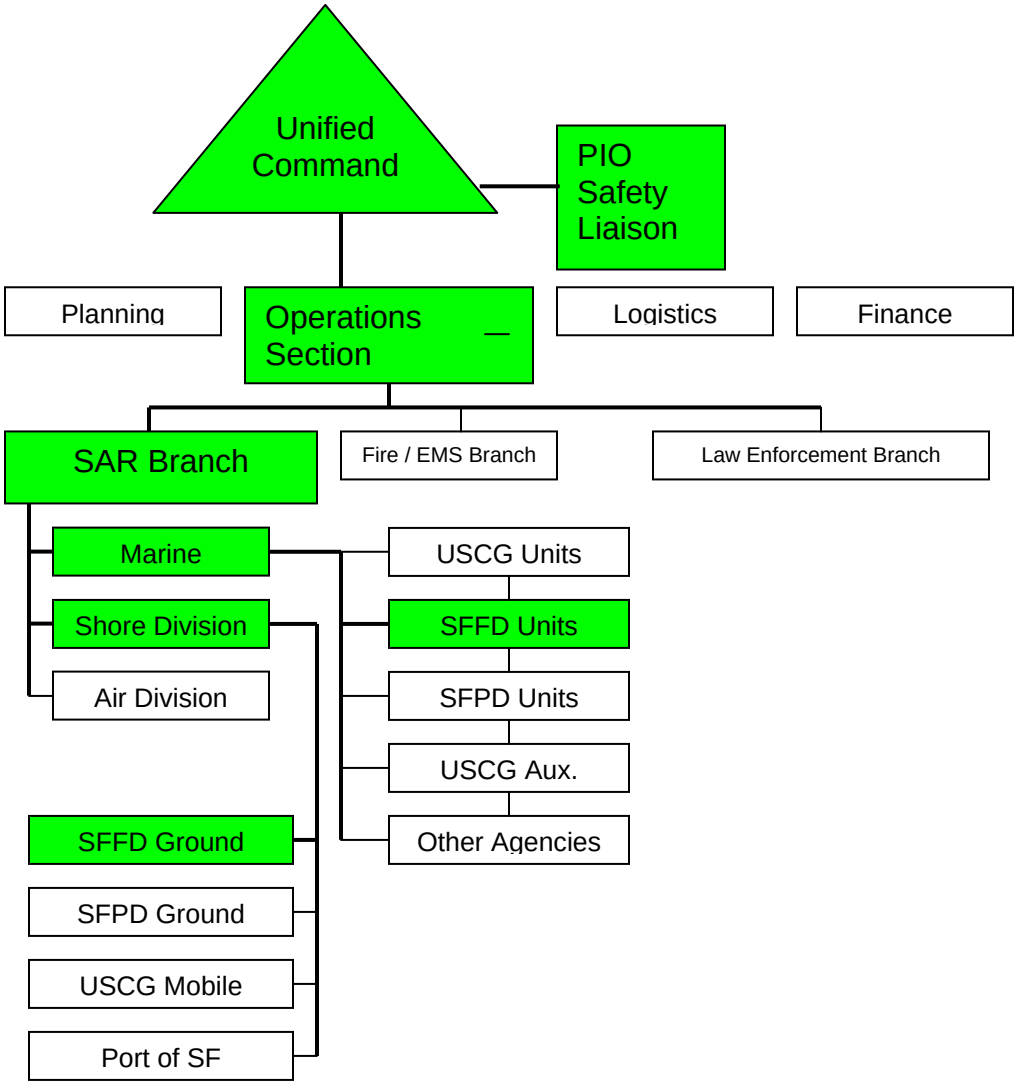
Incident Command System. (SF Incident)

Implementation of the Incident Command System is an initial priority when responding to any incident. ICS is a tool designed to manage your incident. Below is just one example of ICS organization for a marine rescue incident.



Incident Command System. (Regional Response)

When multiple agencies are assigned to an incident the ICP should be expanded into a Unified Command Post. UC will establish tactical objectives and the Section Chiefs will provide incident action plans to complete the objectives.



The Search and Rescue (SAR) Branch Director will coordinate and manage all resources assigned to work in the SAR Branch. The Division Supervisors are responsible for the resources assigned to there divisions and will communicate with Task Force Leaders.

OPERATIONS

Trailer Operations

Towing Vessel On Trailer

Trailer operations are an important part of SFFD RWC/rescue boat operations. From simple haul outs for service to code 3 mutual aid responses safe towing practices are a must. Towing a trailer is subject to all of the laws outlined in the California vehicle code. In addition, driving with a trailer requires extra practice and caution.

Pre Operational Check List:

- Trailer is licensed with the Department of Motor Vehicles and you have the registration certificate in the towing vehicle.
- Lights are working.
- Hitch and safety chains are in good condition and properly attached.
- Tires are in good condition and are properly inflated.
- Tie-downs are in good condition and secure.
- There are no loose bolts, cracks, or broken joints.
- Bearings are lubricated and adjusted according to manufacturer's recommendations.
- Fuel cans and other gear are secure.

On the Road:

- Avoid sudden stops and maneuvers. Remember that your tow vehicle not only has to slow itself, but also several thousand pounds of boat and trailer. Leave plenty of room ahead, behind and beside you when on the road.
- Don't cut corners too tight. Running over curbs or cutting corners can damage the sidewalls of your tires and damage your axle(s).
- Always drive at a safe speed when towing a trailer.
- Insure that your tow vehicle is rated to handle the load you are towing.

At the Ramp / Backing:

- Always remember to check the boat's drain plug is secure before launching.
- Always have a spotter when backing down ramps or parking. Having an extra pair of eyes behind you can eliminate potential accidents.
- When backing a trailer, put your hand on the bottom of the steering wheel and use your mirrors. Then all you have to do is move your hand in the direction you want the trailer to go. (just as you were backing into the station while tillering the truck)
  Practice this in an open area a few times and you'll get the hang of it.

- On average ramps, a good rule of thumb is to back the trailer into the water until the front of the fender is at water level. On extremely flat ramps you usually need to back in further; but on steeper ramps, not so far. Keep in mind that the type of boat could make a big difference here.

Launching Vessel From Trailer

- Be courteous to others by putting your supplies and equipment into your vessel and preparing it for launch away from the ramp.
- Disconnect the trailer lights.
- Remove tie down straps--**but not the winch line.**
- A line tied to the bow is helpful.
- Drive to the ramp and back the boat and trailer down the ramp. Try to keep your vehicle's wheels above the water line.
- Set the emergency brake and shift into "Park."
- Have someone climb aboard, lower the engine into the water, start the blower (if applicable), and start the engine.
- Unhook the winch line. Launch the vessel by pushing it off the trailer or by backing it off under power.
- Pull or drive the boat to the dock.
- Drive the towing vehicle to the parking lot as soon as possible.

Retrieving Vessel Onto Trailer

- Back the trailer into the water until approximately two-thirds of the trailer is submerged. Set the parking brake of the towing vehicle, and shift into "Park".
- Slowly drive the vessel straight onto the trailer. Attach the winch line. Crank the winch to pull the vessel completely onto the trailer.
- Shut off the engine if you haven't already done so.
- Trim the motors up and out of the water.
- Move the boat to the parking lot.
- Unload your vessel.
- Drain the bilge water.
- Attach tie-downs and connect trailer lights. Make sure the trailer lights are working.
- Secure items inside the boat.

Launching and Retrieving Vessel (from a Floating Dock)

Launching vessel from a floating dock:

- Remove cover and tie downs.
- Lower motors into the water and place dock in launch / retrieve position.
- Start motors and slowly back off the dock into the water.
- RWC are launched by pushing the vessel off the dock into the water.

Receiving vessel onto a floating dock:

- Align vessels bow with the floating dock.
- Apply throttle slowly until the vessel drives straight onto the dock.
- Shut down motors and trim them out of the water.
- Attach tie downs and perform post operational procedures.
- Insure vessel is 100% ready to respond

LOW SPEED OPERATIONS / MANEUVERING

Safety: Safety is your number 1 priority at all times. Always wear your safety equipment. Never operate a RWC or rescue boat in a situation that will jeopardize you or someone else's safety. Know you and your vessels limitations and qualifications and always use common sense. Operating a RWC or boat in a rescue situation is serious business and as a professional rescuer you need to be prepared for any situation that may arise.

SITSTAT Reports: While underway for any reason all RWC and boat operators will give a situational report, via radio, to ECD, ICP, or USCG every 15-30 minutes. The situational report will be brief and include the following information:

- Operational Status
- Location / Position
- Course / Direction of Travel
- Destination and ETA if applicable

Example: *"Marina Command, this is RWC 1 on A-14…RWC1, Go Ahead… Marina Command, RWC1 Ops normal 100 yards off of Pier 39 in route to Golden Gate Bridge to begin shoreline search. RWC1 message received."*

Docking and Mooring

Always operate at idle speed when docking and mooring. Wind and current always need to be assessed before approaching a dock. It is always easier and safer to approach a dock with the bow of your vessel into the wind and current. Approach the dock at a 30 degree angle. Just before your bow touches the dock turn the helm away from the dock and swing the stern of the vessel alongside. You may briefly shift the vessel into reverse to slow the vessels forward motion. Tie off the vessel. In the event you need to moor up with the wind and current behind you have a mooring line ready and tied to the stern of your vessel. Approach at a parallel angle and swing the stern of the vessel into the dock. Quickly attach the aft mooring line and the wind and current will push your vessel into the dock. Tie off the vessel. When operating a RWC at low speed or idle insure you and your passengers are centered on the vessel and to remain still. Sudden movement may cause the vessel to list or capsize.

Operating Around Fixed Objects, Docks, and Piers

Operating any vessel in and around docks or objects while attempting to make a rescue or deploying a medical or dive team is serious business. Always operate at idle speed. Wind and current always need to be assessed. Whenever possible make your approach and maneuver into the wind and current. Know the pivot points of the vessel. The stern or rear of the vessel will swing in the opposite direction that you turn the helm.

Operating Around People in the Water

When performing a rescue, retrieving a rescue swimmer, or conducting dive operations, **all vessel operations within 30 feet of the PIW must be at idle speed.** When the PIW is alongside or near the stern of the vessel the boat must be in neutral. For vessels equipped with twin motors the engine on the side of the PIW must be in neutral and the other engine may be used to maneuver the vessel. Crew members will keep a visual and point in the direction of the PIW. Wind and current always need to be assessed. Instruct crewmembers which side of the vessel you plan on retrieving the PIW. Retrieve the PIW.

Towing Another Vessel

In the event a vessel is in immediate danger and you are able to safely tow the vessel please follow these guidelines.

1. If the vessel you are assisting is in danger of running aground ensure your vessel remains in safe water as you assist the vessel.
2. Have everyone aboard the vessel you are assisting put on their PFD.
3. Communicate with the vessel on the radio or loudhailer and explain what your intentions are.
4. Approach the vessel and hold station with the stern of the rescue boat 20 feet away from the vessel.
5. Throw a rope bag to the vessel. Attach rope bag line to the tow line and instruct the vessel crew to haul in the tow line using the throw bag line. Instruct the vessel crew not to use the throw bag line for towing.
6. Have the vessel crew attach the tow line to the bow of their vessel.
7. Adjust the length of the line and make it off on the towing bit of the rescue boat.
8. Slowly tow the boat to safety.
9. To place the vessel being towed into a berth or dock change to an alongside tow and maneuver the vessel to the dock.

If a vessel is not in any immediate danger have the crew drop anchor and call a marine towing agency to assist them.

HIGH SPEED OPERATIONS

High Speed Maneuvering

RWC and rescue boats are very fast and maneuverable. One of the most important aspects to safely operate an RWC or a rescue boat at any speed is control and balance. Operators traveling at high speeds should always be in a standing position with your knees and elbows slightly bent. All crewmembers should be stationed next to or behind the operator and be holding on to a rail or handle. Always anticipate shifts in your vessels stability when turning or operating in rough conditions. Always operate responsibly. Never allow the vessel to jump out of the water when passing waves or operating in rough conditions. Give yourself plenty of room. Do not head straight at objects but come along side them. Be sure you are aware of your surroundings at all times. Only friction between the boat and the water or a collision will stop the movement of your vessel.

RESTRICTED VISIBILITY, NIGHT OPERATIONS AND MINIMUM OPERATING DEPTHS

Night Operations

SFFD RWC shall not be operated during nighttime hours. All other SFFD vessels will operate at safe and controlled speeds during night operations. Vessels equipped with radar must have it energized and operating. Vessel navigation lights must be on at all times while underway at night.

Restricted Visibility

Fog is a normal sight on our bay. SFFD vessels that are not equipped with radar or GPS systems shall not be operated in heavy fog conditions. The minimum visibility for non radar / GPS equipped vessels is 200ft. When operating in restricted visibility conditions keep you vessel as a safe speed, watch your radar and listen for fog signals from other vessels and ATON. Remember to activate your fog horn so other vessels can also hear you.

Minimum Operating Depths

SFFD RWC's shall not be operated in water less than 36 inches deep. The minimum for rescue boat operation is 4 feet. In certain instances it may be necessary to beach a RWC. Insure the motor is shut off prior to beaching the vessel. (Proper beaching procedures will be covered in the SFFD RWC Operators Course) Operating in shallow areas can cause damage and injuries.

UNDERWAY EMERGENCIES

Man Over Board (MOB)

In the event you have a man overboard the following procedures will be followed:

1. Crew will yell "man over board" and give the side of the vessel in which the person fell in the water. Example: "man overboard port side!"
2. Crew will throw life ring into the water and point towards the MOB. Crew will also throw floating strobe light for night MOB emergencies.
3. Operator will push the MOB button on the GPS and notify ECD. This will allow the operator to return to the exact location the person fell into the water.
4. Operator will proceed forward to ensure the MOB is clear of the stern.
5. Operator will maneuver the vessel to come around and retrieve the MOB.

Engine Failure

In the event of an engine failure the following procedures will be followed:

1. Notify ECD and give your location.
2. If vessel is in danger of running aground or close to surf lines immediately anchor the vessel. RWC operator will enter the water and swim the vessel to safety if possible.

3. Attempt to identify the engine problem and restart the motor.
4. Wait for assistance.

Radar / GPS Failure

In the event of a radar and GPS failure while operating in restricted visibility the following procedures will be followed:

1. The operator will slow to a safe speed and notify ECD of their situation and location.
2. If it is safe the operator will drive the vessel to the closest dock.
3. In the event visibility prevents safe operation of the vessel the operator will remain in a safe position and wait for assistance.

Crew Member Injury Or Illness

If a crew member becomes ill or is injured he or she shall be attended to by other crew members and ECD will be notified of the situation and your location. The closest BC and EMS Company will meet at a designated location to care for the crew member and complete a report.

Fire

In the event of a fire while underway the following procedures will be followed:

1. The operator will notify ECD of the situation and give the vessel location.
2. Crew will access on board fire extinguisher and attempt to suppress the fire.
3. If the fire can not be suppressed call for assistance and abandon the vessel if needed.

Non – Verbal Communications / Hand Signals

The following hand signals shall be used when verbal communications are compromised:

O.K.	Tap one hand on top of head
Help	One arm straight up overhead
Direction of travel	Point one arm and hand in desired direction
Slow Down	Thumb or hand pointing downward
Speed Up	Thumb or hand pointing upward
Stop	Hand moving across throat in cutting motion
O.K. to Approach	Two thumbs up by operator, hands off the controls

HELICOPTER OPERATIONS

Agencies With Helicopters

There are several agencies in the region that could be utilized to assist us in our marine rescue operations.

1. USCG
2. CHP
3. East Bay Regional Parks
4. Sonoma County Sheriff Department
5. US Navy
6. Other Military

Some of these aircraft are equipped with a hoist to lift victims into the helicopter. Others utilize a static long line system under the aircraft to lift and move the victim to shore or another vessel.

Hoisting Operations

There are three different ways to hoist a rescuer or victim into a helicopter. 1. Sling Harness. 2. Rescue Basket. 3. Stokes Litter. The helicopter crew will communicate with the RWC or rescue boat crew to determine what will be the best way to hoist the victim.

1. The helicopter will fly into the wind traveling less than 5 knots. (around 20 ft off the water)
2. The pilot will give the RWC/rescue boat operator a safety briefing and instructions to follow in case of an emergency during the hoist.
3. The RWC or rescue boat will remain just behind the aircraft matching course and speed.
4. The aircraft will lower the appropriate device to the water.
5. Maintain your course and slowly speed up and hold station with the device.
6. **To avoid a static shock be sure not to touch the device until it has touched the water or been grounded on your vessel.**
7. Quickly place the victim in the rescue device.
8. Secure the victim and give the aircraft the signal to hoist the victim.
9. Slowly accelerate and move safely away from the aircraft.
10. Stand by in a safe location until the aircraft gives an all clear.

Long Line Rescue Operations

A long line or static line rescue from a helicopter involves providing a landing zone (LZ) for the aircraft to land and set up the rescue gear. The rescue line is connected to the underside of the aircraft. The rescuer is maneuvered with the movement of the helicopter. A rescuer usually rides on the rescue line along with the chosen rescue device. Once a rescue is performed the rescuer and the victim will be taken to the LZ or another vessel to be dropped off. The helicopter will have to land at the LZ to detach the rescue equipment.

1. Follow steps 1-3 in hoisting operations.
2. The Aircraft will position the rescuer just off the water.
3. Slowly move to the rescuer and hold station.
4. Assist the rescuer securing the victim to the selected rescue device.
5. As the aircraft lifts the rescuer and victim slowly and safely move away from under the aircraft.
6. Stand by until the aircraft gives the all clear.

Helicopter Communications (Air to Ground)

All of the agencies mentioned under Mutual Aid / Joint operations have access to marine frequencies. A designated marine channel will be utilized for all air to ground communication.

SPECIAL EVENT OPERATIONS

Event Operations

There are several organized special events every year on the bay that involve the use of public safety vessels to stand by and provide marine safety and security for an event. An IAP (incident action plan) or EAP (event action plan) is the working document that covers all the information that you will need to work the event. If you are assigned to a special event stand by it is you responsibility to understand the IAP / EAP and be able to meet the objectives before you begin your operational period. The IAP / EAP covers the following:

1. ICS / Unified Command
2. Communications
3. Operational Areas and Objectives
4. Emergency Action Plan
5. Causality Collection Points
6. Logistics plan for fuel and food
7. Demobilization

If you are assigned to an event without an IAP take the time to make a quick plan with you crew on the above 7 items. Preplanning can save time and lives in the event of an incident during the event. Note: When assigned to a swim event stage away from the swimmers and down wind if possible. Carbon Monoxide and exhaust fumes hover on the water surface and can harm the swimmers.

RESCUE OPERATIONS

Active Victim

Active Victim / RWC Single Rescuer: An active victim is someone in the water that is still moving who you can communicate with. The proper procedure to rescue an active victim as a single rescuer is as follows:

1. Conduct a scene size up and look for any hazards.
2. Always approach the victim upwind and into the current whenever possible.
3. Approach the victim at idle speed and position your vessel to have the victim pass down on your port side. As you approach let your victim know your intentions and give commands. If you need time to plan your pick up throw the victim a flotation device to hold onto.
4. As you approach, ask the victim to give you his or her left hand. (Remember it is always easier to retrieve a victim on the port side and use you left hand because the throttle control is on the right side of the helm.)
5. Grab the victim's left hand with your left hand and swing the victim to your vessel.
6. Do not let go of the victim and assist him or her to the stern of the vessel.
7. Assist the victim onto the vessel. If the victim is unable to sit behind you and hold on place the victim on the seat in front of you to insure there safety.
8. Transport the victim to another vessel or to shore.

Active Victim / RWC Dual Rescuer:

1. Follow steps 1-4 as mentioned for single rescuer
2. If you need time to plan your pick up have your rescuer swim to the victim to assist until retrieved by the RWC.

3. Grab the victim's left hand with your left hand. Guide the victim to your rescuer who is located in a prone position on the rescue board.
4. The rescuer will take control of the victim and place them on the rescue board or on the back seat of the RWC. The rescuer will secure the victim.
5. Transport the victim to another vessel or to shore.

Active Victim / Rescue Boat:

6. Conduct a scene size up and look for any hazards.
7. Always approach the victim upwind and into the current whenever possible.
8. Approach the victim at idle speed and position your vessel to have the victim pass down the side of the vessel. Notify your boat crew what side you intend to pick up the victim. As you approach let your victim know your intentions and give commands. If you need time to plan your pick up throw the victim a flotation device to hold onto or deploy a rescue swimmer if needed.
9. Assist the victim onto the vessel.

Passive Victim

Passive Victim / RWC Single Rescuer: A passive victim is someone in the water that is not moving whom you cannot communicate with. The proper procedure to rescue a passive victim as a single rescuer is as follows:

1. Conduct a scene size up and look for any hazards.
2. Approach the victim at idle speed.
3. Position the victim on the port side of the vessel.
4. Grab and maneuver the victim to keep the airway out of the water.
5. Check for breathing and a pulse. (Always consider spinal immobilization with unconscious victims.)
6. Continue to keep the victims head out of the water and wait for assistance to move the victim.

Passive Victim / RWC Dual Rescuers:

1. Follow steps 1 - 3 from above, single rescuer.
2. Operator and rescue swimmer will work together to get the victims airway out of the water and move the victim onto the rescue board.
3. Check for breathing and a pulse. (Always consider spinal immobilization with unconscious victims.)

4. Move the victim to the closest vessel of opportunity or shore.

Passive Victim / Rescue Boat:

1. Conduct a scene size up and look for any hazards.
2. Approach the victim at idle speed.
3. Grab and maneuver the victim into the vessel. (Always consider spinal immobilization with unconscious victims.)
4. Begin assessment and patient care.

Multiple Victims

Multiple Victims RWC Single / Dual Rescuers and Rescue Boat: Dealing with multiple victims at the same time can be overwhelming and requires quick and accurate decision making. The same actions mentioned in above sections (for one victim) will be followed to rescue multiple victims at an incident. Operators must do a rapid assessment of the victims to determine their action plan.

1. Conduct a scene size up and look for any hazards.
2. How many victims do you have? Active / Passive
3. Give updates and request additional resources if needed.
4. Throw your Peterson Tube or PFD to active victims that are waiting to be rescued.
5. First priority should be given to active victims that are injured or in distress and passive victims that have been in the water for 10 minutes or less.
6. Second priority should be given to other active victims.
7. Third priority should be given to passive victims that have been in the water for longer than 10 minutes.

Under Pier Operations

Under Pier Rescue: RWC / rescue boat operation under and around piers is hazardous and requires advanced operator knowledge and skills. Pier construction involves a multitude of hazards that can cause damage or injury to the rescue craft and personnel. In addition to the hazards involved with under pier rescue is tide consideration. Always know what the tide is doing to determine if it is safe to operate under a pier. Most RWC damage occurs during operations under or around piers.

1. Conduct a scene size up and look for any hazards.
2. Preplan you entry and exit points to access the pier.
3. Always operate at idle speed while working around and under piers.

4. When possible conduct operations with the bow of your vessel headed into the current.
5. Always be aware of your surroundings and remember your pivot points when turning your vessel.
6. Always know the current tide conditions.

Victim Removal from a Fixed Object

Fixed Object RWC Rescue Single / Dual Rescuer and Rescue Boat: Fixed objects can be found all over the bay and come in many shapes and sizes. During an aquatic emergency it is common for victims to hold or climb onto fixed objects to rescue themselves from drowning. It is easier to rescue a victim that is out of the water. A person that is in the water and holding onto a fixed object can be crushed between the RWC / rescue boat and the object they are holding onto.

1. Conduct a scene size up and look for any hazards.
2. Assess the victim's condition and ability to follow commands.
3. Approach the victim up current and upwind if possible.
4. Approach at idle speed.
5. If the victim is out of the water on an object have them put on a PFD or wrap a Peterson tube around them. Assist the victim onto the RWC or boat. For a two person RWC rescue have your rescue swimmer climb onto the object with the victim and assist them with the PFD and then onto the RWC.
6. If the person is in the water give them a Peterson tube to hold onto. Assist the victim onto the RWC. For an RWC two person rescue have the rescue swimmer swim to the victim and place the Peterson tube. The swimmer can then safely swim the victim away from the object to be rescued.
7. RWC's will move the victim to the closest vessel of opportunity or to shore.

Personnel Transfer to and from Other Vessels While Underway

Personnel / Victim Transfers: When transferring personnel or victims to another vessel the smaller of the two vessels should maneuver to come along side the larger vessel. It is always easier to perform a transfer with both vessels moving forward into the wind and current at idle speed.

1. Conduct a size up on conditions and look for hazards.
2. Ensure the receiving vessel is ready for you to come alongside for the transfer.
3. RWC / rescue boat operator will give safety instructions to the person or victim that is being moved to the other vessel.

4. Position the RWC / rescue boat off the port or starboard rear quarter of the vessel you are approaching.
5. Slowly make your approach and come along side the receiving vessel.
6. Hold position 5 feet away from the vessel and match speed.
7. Hold your matched speed with the receiving vessel at the point you will make the transfer.
8. Keeping the same speed as the receiving vessel, slowly turn to the vessel and hold position next to the vessel.
9. Transfer the person or victim to the other vessel.
10. Keeping the same speeds slowly turn away from the vessel and gradually speed up safely breaking away.
11. Follow the same steps when receiving someone to your vessel.

Operating in Surf, Rough Water, and Current

Surf Operations: Operating a RWC in surf requires additional specialized training. RWC have proven to be a safe and effective means for surf rescue operations. A separate annex will be added to these SOG's specifically designed to cover surf operations. SFFD Rescue Boats will not be operated in the surf.

Rough Water Conditions: San Francisco Bay conditions vary from flat seas to 6ft plus wind waves and chop. Wind and current are contributing factors to the bays sea conditions.

1. Your safety comes first. Never operate out of your comfort zone. If conditions are too hazardous you have the option not to respond.
2. Always operate at a safe speed and always keep the RWC / rescue boat in the water. Jumping waves can cause damage to the RWC / rescue boat and injury to the operator or crew.
3. Always operate the RWC / rescue boat in a standing position with your knees and elbows slightly bent.
4. Keep a sharp lookout for objects and other vessels. Rough conditions reduce your visibility on the water.
5. Pay extra attention to securing your equipment and your victim when operating in rough conditions.

Current: With the tidal movement on SF Bay current is always a factor to deal with while operating a RWC or rescue boat. Current can also be generated from the prop wash of a ferry or tug boat. While ferry boats are moored they maintain forward propulsion to stabilize the vessel for the passengers. Tug boats use large

amounts of power to help push barges and maneuver ships. Always avoid passing too closely astern of these vessels.

1. Whenever possible have the bow of your vessel facing into the current during idle speed operations such as a rescue or docking the vessel.
2. SF Bay currents will have little effect on your vessel during high speed operations.
3. Always know the speed and direction of currents.
4. Always be aware of your position as it can change quickly in a fast moving current.

Rescue Boat Dive Operations

When utilizing a rescue boat to deploy and retrieve divers the boat operator and dive team leader will work together and both agree on operational and safety objectives for the dive. Whenever possible tie off the vessel to a fixed object or anchor prior to deploying divers. This allows the vessel to be kept in place without the use of the motors. Tenders will always work from the bow and sides of the vessel and ensure tender lines stay clear of intakes and propellers.

TRAINING REQUIREMENTS

Rescue Boat Crewmember Course

Rescue Boat Crewmember: 6-8 hours
Curriculum:

- Introduction to vessel
- Location and operation of all vessel equipment
- Location and operation of all vessel safety / rescue equipment
- Marlinspike Seamanship
- Launching and retrieving vessel from trailer
- Communications
- Docking and mooring
- Underway Procedures
- Underway Emergencies: Fire, MOB, injured crewmember / operator
- Underway personnel transfers to and from other vessels
- Rescue Operations
- Helicopter Operations

Rescue Boat Operator Course

Rescue Boat Operator / Coxswain: 32 Hours + additional underway time with Training Officer.

Day 1:

- Review of Crewmember Course
- Boating Laws and Regulations
- Rules of the Road / Navigation
- Aids to Navigation
- Marine Communications
- Overview of SF Bay

Day 2:

- Towing, Launching, and Receiving
- Daily operations check procedures
- Prepping to get underway
- Getting underway, Docking, and Mooring
- Launching and retrieving vessel from Jet Dock
- Review

Day 3:

- Daily Operations Check Procedures
- Underway Operations
- Low Speed Maneuvering
- High Speed Operation
- Underway Emergencies: MOB, Fire, Crewmember Injury
- Plotting / Navigating
- Restricted Visibility Operations

Day 4:

- Daily Operations Check
- Plotting a course and responding to that location (also conducted at night)
- Marine Communications Review
- Search Patterns (also conducted at night)
- Rescue Procedures (also conducted at night)
- Underway Personnel Transfers
- Towing and Being Towed
- Helicopter Operations (also conducted at night)
- Night Operations

Additional Underway Time with Training Officer:

- Boat Operator Task Book Must be completed for final certification
- Completion of NASBLA, USCG, or USPS online boating safety course
- Tow and Back Vessel / Trailer through cone course.
- Prep Vessel and Launch from trailer.
- Retrieve Vessel onto trailer and secure for towing.
- Launch and retrieve vessel from Jet Dock

- Locate and identify all equipment.
- Properly Operate all Electronic Equipment
- Get Underway from dock. Port and Starboard
- Docking and Mooring Port and Starboard
- Maneuver in Confined area.
- Safely operate vessel through high speed course
- Identify key locations and all piers
- Identify ships, ferries, and public service vessels
- Identify Aids to Navigation (day and night)
- Plot course and navigate to three locations
- Plot course and navigate to three locations (Restricted Visibility)
- Plot and conduct shoreline, parallel, and grid search patterns
- Perform (3 each) port and starboard man overboard drills
- Perform (3 each) port and starboard underway personnel transfers
- Perform (3 each) port and starboard pick ups from fixed object
- Perform (3 each) port and starboard pick ups from the water (open water)
- Perform 3 pick ups from water in confined space
- Deploy and retrieve rescue swimmer
- Deploy and retrieve rescue diver
- Perform helicopter hoist operations with USCG or CHP Helo

Rescue Water Craft Operator Course

Rescue Water Craft Operator: 16 Hours + additional underway time with Training Officer

- Introduction (Instructors and operator training membersstudents)
- Personal Watercraft Safety and Legal Requirements
- Philosophy of PWC Use / Rules of the Road
- Orientation and Terminology of Personal Watercraft
- NIMS / ICS / Marine Communications for PWC Ops
- Pre and Post Ops PWC Inspection
- Launching and Receiving a PWC
- Boarding a PWC from Shore and Water
- Righting a PWC
- Basic Maneuvering
- Servicing and Restarting a Flooded PWC
- Single Pilot Rescue Procedures
- Single Pilot Rescue Procedures with Rescue Board
- Pilot / Rescuer (Team) Rescue Procedures with Rescue Board
- Mock Rescue Scenarios
- Placing a PWC Back in Service / Post Ops Inspection
- Completion of NASBLA, USCG, or USPS online boating safety course and RWC task book must be accomplished prior to final certification.

Written Test
RWC , Rescue Boat Crew, and Rescue Boat Operator Trainees will be required to pass a written test with a score of 70% or higher for final certification in the area of training received

Individual Rescue Boat Certification

There are several different types of rescue vessels used by the SFFD. Every vessel is different and certified SFFD boat operators will complete an orientation and operational check ride with a training officer prior to operating the vessel.

Example: Lt. A is certified to operate a twin engine rescue boat but has never operated the airboat at SFO. Lt. A will contact an airboat training officer and become passed up to operate the vessel. The Special Operations chief will keep lists of all SFFD certified rescue boat and RWC operators and what vessels they are certified to operate.

SFFD Vessels Types (Small Vessels)
Fireboat Skiffs
Rescue Water Craft
21' Twin Engine RHIB
25' Twin Engine Safeboat
27' Twin Engine Boston Whaler
SFO Airboat

APPENDIX D VHF-FM MARINE FREQUENCY GUIDE

Channel Number	Ship Transmit MHz	Ship Receive MHz	Use
01A	156.050	156.050	Port Operations and Commercial, VTS. Available only in New Orleans / Lower Mississippi area.
05A	156.250	156.250	Port Operations or VTS in the Houston, New Orleans and Seattle areas.
06	156.300	156.300	Intership Safety
07A	156.350	156.350	Commercial
08	156.400	156.400	Commercial (Intership only)
09	156.450	156.450	Boater Calling. Commercial and Non-Commercial.
10	156.500	156.500	Commercial
11	156.550	156.550	Commercial. VTS in selected areas.
12	156.600	156.600	USCG VTS SF Offshore
13	156.650	156.650	Intership Navigation Safety (Bridge-to-bridge). Ships >20m length maintain a listening watch on this channel in US waters.
14	156.700	156.700	USCG VTS SF Inland
15	--	156.750	Environmental (Receive only). Used by Class C EPIRBs.
16	156.800	156.800	International Distress, Safety and Calling. Ships required to carry radio, USCG, and most coast stations maintain a listening watch on this channel.
17	156.850	156.850	State Control (DFG)
18A	156.900	156.900	Commercial
19A	156.950	156.950	Commercial
20	157.000	161.600	Port Operations (duplex)
20A	157.000	157.000	Port Operations
21A	157.050	157.050	U.S. Coast Guard only (SFFD approved to use)
22A	157.100	157.100	Coast Guard Liaison and Maritime Safety Information Broadcasts. Broadcasts announced on channel 16.
23A	157.150	157.150	U.S. Coast Guard only (SFFD approved to use)
24	157.200	161.800	Public Correspondence (Marine Operator)
25	157.250	161.850	Public Correspondence (Marine Operator)
26	157.300	161.900	Public Correspondence (Marine Operator)
27	157.350	161.950	Public Correspondence (Marine Operator)

Channel Number	Ship Transmit MHz	Ship Receive MHz	Use
28	157.400	162.000	Public Correspondence (Marine Operator)
63A	156.175	156.175	Port Operations and Commercial, VTS. Available only in New Orleans / Lower Mississippi area.
65A	156.275	156.275	Port Operations
66A	156.325	156.325	Port Operations
67	156.375	156.375	Commercial. Used for Bridge-to-bridge communications in lower Mississippi River. Intership only.
68	156.425	156.425	Non-Commercial
69	156.475	156.475	Non-Commercial
70	156.525	156.525	Digital Selective Calling (voice communications not allowed)
71	156.575	156.575	Non-Commercial
72	156.625	156.625	Non-Commercial (Intership only)
73	156.675	156.675	Port Operations
74	156.725	156.725	Port Operations
77	156.875	156.875	Port Operations (Intership only)
78A	156.925	156.925	Non-Commercial
79A	156.975	156.975	Commercial. Non-Commercial in Great Lakes only
80A	157.025	157.025	Commercial. Non-Commercial in Great Lakes only
81A	157.075	157.075	U.S. Government only - Environmental protection operations.
82A	157.125	157.125	U.S. Government only
83A	157.175	157.175	U.S. Coast Guard only (Mutual Aid SAR for SFFD)
84	157.225	161.825	Public Correspondence (Marine Operator)
85	157.275	161.875	Public Correspondence (Marine Operator)
86	157.325	161.925	Public Correspondence (Marine Operator)
AIS 1	161.975	161.975	Automatic Identification System (AIS)
AIS 2	162.025	162.025	Automatic Identification System (AIS)
88A	157.425	157.425	Commercial, Intership only.