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of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: AIRPORT WATER RESCUE
PLANS, FACILITIES, AND EQUIPMENT

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AC No: 150/5210-13C
Change:

1. **PURPOSE.** This Advisory Circular (AC) provides guidance to assist airport operators in preparing for water rescue operations.
2. **CANCELLATION.** This AC cancels AC 150/5210-13B, *Water Rescue Plans, Facilities, and Equipment*, dated April 14, 2004.
3. **APPLICABILITY.** The material contained in this AC applies to the operation of civil airports where aeronautical activity is conducted near a significant body of water. This AC provides guidance in meeting the requirements outlined in Title 14 Code of Federal Regulations (CFR) §139.325, *Airport Emergency Plan*. An airport operator may elect to follow an alternative method, provided it is also found by the Federal Aviation Administration (FAA) to be an acceptable means of complying with 14 CFR Part 139, *Certification of Airports*. For certificated airports (part 139), the use of the guidelines and standards in this AC is mandatory. In the event of a conflict, 14 CFR part 139 takes precedence over all other documents identified in the AC. The standards contained in this AC must be used for the development of new Airport Water Rescue Plans and are to be implemented at all part 139 certificated airports no later than one year from the effective date of this AC.

For all other airports the FAA recommends the use of the guidelines and standards contained herein for the development of Airport Water Rescue Plans.

4. **REFERENCE MATERIAL.** AC 150/5200-31, *Airport Emergency Plan (AEP)*, AC 150/5210-7, *Aircraft Fire and Rescue Communications*, and NFPA 1584, *Standard on the Rehabilitation Program for Members during Emergency Operations and Training*, provide related guidance.

5. PRINCIPAL CHANGES.

- a. Added information on swift water rescue applications.
- b. Included references to National Fire Protection Association (NFPA) documents: NFPA 1670 *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2009 Edition, NFPA 1006 *Standard for Technical Rescuer Professional Qualifications*, 2008 Edition, and NFPA 1925 *Standard on Marine Fire-Fighting Vessels*, 2009 Edition.
- c. Added Appendix A, Sample Aircraft Water Rescue Plan.
- d. Added Appendix B, Sample Water Rescue Checklist.
- e. Removed references to manufactured equipment sources.

- f. Included reference to Transportation Research Board/Airport Cooperative Research Program (TRB/ACRP), *Guidance for Identifying and Mitigating Approach Lighting System Hazards*.

6. METRIC UNITS. To promote an orderly transition to metric units, the text and figures include both English and metric dimensions. The metric conversions are based on operational significance and may not be exact equivalents. The conversion procedure used throughout the AC applies the relationship of 1 foot equals 0.3 meter, except for a few instances where rounding was used in order for linear dimensions to sum correctly. Until there is an official changeover to the metric system, the English dimensions must be used.

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1. INTRODUCTION.

This AC provides guidance on the special considerations airport operators must consider when preparing for water rescue operations in the vicinity of an airport. These include preplanning issues, such as delineation of responsibilities, the planning process, training, and equipment.

2. BACKGROUND.

2.1 Inputs from Other Agencies. This AC incorporates lessons learned as a result of National Transportation Safety Board (NTSB) investigations. It also contains updated sources of information about water rescue training from the United States Coast Guard (USCG) and related training offered by some Maritime Universities.

In addition, the Coast Guard has issued [COMDTINST M16130.2E, Coast Guard Addendum \(CGADD\) to the United States National Search and Rescue Supplement \(NSS\)](#), which is a supplement to the *International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)*. This addendum established policy, guidelines, procedures and general information for Coast Guard use in Search and Rescue (SAR) operations.

- a. **Domestic Operations.** Aircraft involved in domestic operations carry "slide raft/flotation devices" as well as life vests (inflatable or seat cushion type) for each passenger.
- b. **Overseas Operations.** In contrast, aircraft engaged in overseas operations carry inflatable life vests, large rafts, and other flotation devices capable of getting a large number of passengers out of the water. This equipment is most useful in a ditching where there is time to preplan and brief the passengers about what they must do when the plane lands in the water.
- c. **Approach and Departure.** Accidents around airport environs generally take place during the approach to or departure from the airport. A 1985 in-house study by the NTSB entitled, "Air Carrier Over Water Emergency Equipment and Procedures (NTSB Report SS-85/02) found "Current procedures and equipment are designed on the assumption that air carrier water contact accidents are primarily ditching, a water accident characterized by at least some preparation time and relatively little aircraft damage. In fact, a review of air carrier water contact accidents between 1959 and 1984 shows that such accidents are typically inadvertent, with no preparation time, substantial aircraft damage and a high chance of occupant injury. Typically, these accidents do not occur on [extended over water flight]...but close to an airport, during approach and departure..." In addition, it must be noted that many aircraft accidents have occurred between the outer marker and the physical runway end. These areas must be a primary focus in water rescue planning.

2.2 Water Rescue Preparedness. Airport officials responsible for emergency preparedness must develop an airport emergency plan that includes a section on water rescue (as detailed in AC 150/5200-31, *Airport Emergency Plan*). See Appendix A and B for a sample Aircraft Water Rescue Plan and Checklist. It must specify any specialized rescue training and equipment needed to provide safe water rescue services given by the airport's proximity to bodies of water. In addition the plan must address the unique character or "type" of water around the airport, as it may be a critical factor in emergency planning. For example, in Hawaii, coral reefs close to the shoreline demand unique approaches to water rescue.

Many airports will need to rely on mutual aid partners for resources and personnel related to response to an aircraft accident/incident in the water. These mutual aid partners also have a significant role in planning as well as the execution of water rescue drills and exercises.

3. SPECIAL CONSIDERATIONS.

3.1 Major Survival Factors. Survivors of aircraft accidents in water may be subjected to post impact fires, fuel/vapor inhalation, ingestion, hypothermia, further injury from debris, drowning, and/or attack by marine life.

Air crash survivability in a water environment depends on certain factors:

- a. The deceleration forces do not exceed the known tolerable limits of the human body.
- b. The restraint system-seatbelts, seat structure, and seat anchorage points remain intact.
- c. The occupied areas remain relatively intact to prevent ejection and to provide living space for the occupants.
- d. The rapid response of trained rescue personnel.
- e. Availability of a sufficient number of rescue craft.

If any of the above is absent, the likelihood of a successful rescue is significantly diminished.

3.2 Water Temperature. Survivors of water crashes must depend more on rescue personnel than survivors of similar incidents on dry land because of exposure related issues. Not only will the passengers be unprepared to be in water, but they will also experience increased body-cooling rates due to evaporating fuel. It is recommended that rescue personnel consider all survivors to suffer from hypothermia until medical personnel determine otherwise.

3.3 Duration of Exposure. Water Rescue plans must also take into account the proper treatment of survivors after their rescue. The water rescue plan must include provisions for removing fuel from survivors (particularly from their eyes) as soon as possible. Water rescue craft must carry the appropriate number of blankets based on their anticipated rescue capacity. These blankets can be used to wrap each victim while in transit to medical facilities. The blankets on rescue craft must be made of wool and not polartec, fleece, space blanket material, or other fabrics.

3.4 Evacuation. Water rescue planning must account for problems transporting survivors from the water to casualty collection areas (i.e., pre-determined triage, decontamination and transportation zones).

3.5 Nature of Injuries. Passengers in aircraft accidents may have sustained a variety of injuries prior to being rescued from the water. First responders must use prudent judgment in the handling and transportation of these victims, who have not yet been assessed or triaged.

3.6 Specific Hazards and Preparation for Treatment. Certain bodies of water near an airport may have known specific hazards which may further compromise the safety of victims or rescuers. These hazards may include marine life such as alligators or sharks, natural hazards to people in the water such as waterfalls, swift currents, and coral reefs. The water rescue plans must include precautions to be taken by boat operators and rescuers as well as special instructions related to reducing risks for these hazards or treating victims affected by these hazards.

3.7 Seasonal Procedures. Certain elements of the water rescue plan may change significantly based on seasonal and climatic changes. Increased congestion of waterways during recreational boating seasons or loss of available resources such as Harbor Tour Boats “off season” may change procedures or require modification of plans. Bodies of water subject to freezing may require alternative procedures, training and/or equipment. Water channels subject to freezing may require monitoring and notification of agencies responsible for ice breaking.

3.8 Approach Lighting Systems. Runway end lighting systems present a significant structural impact hazard as well as an acute electrical hazard, requiring the need to preplan for the approach of emergency vehicles, rescue vessels and de-energizing the electrical system. (reference TRB/ACRP, *Guidance for Identifying and Mitigating Approach Lighting System Hazards.*)

4. WATER RESCUE RESPONSIBILITIES.

4.1 Certificated Airports. In accordance with 14 CFR Part 139.325, certificated airport operators are to include in their airport emergency plans provisions for the rescue of aircraft accident victims from significant bodies of water or marsh lands situated adjacent to the airport and beneath the approach and departure flight paths of air carriers.

- a. **Significant Body of Water.** A body of water or marshland is significant if the area exceeds one-quarter square mile (0.6 sq km) and cannot be traversed by conventional land rescue vehicles. Some airports have large detention ponds on the airport property. In many cases, these ponds are in proximity to the runway and of sufficient size and depth to create a significant hazard to an aircraft which may enter the pond. The emergency plan must include all significant bodies of water and marshlands located within at least 2 miles (3.2 km) of the end of an airport runway which cannot be traversed by conventional and rescue vehicles, including detention ponds. Detention ponds on the airport property which may be less than one quarter square mile (0.6 sq km) and that cannot be traversed by conventional land rescue vehicles, may require special rescue equipment (i.e., extendable ladders).
- b. **Identification of Responders.** The airport emergency plan must include the name, address, and telephone number of each water rescue unit, service, or government agency (i.e., Coast Guard, Harbor Patrol or specially trained marine law enforcement and fire department units) responsible for conducting water rescue operations. The USCG Auxiliary may provide valuable services in specific roles such as maintaining a security zone around an accident site. Auxiliary personnel must have specific training for their role in the plan. A designated flag for the auxiliary boat identifying them as an authorized, responder will help distinguish them from pleasure craft.

4.2 Primary Response Agency Other Than Airport. Even when the airport operator is not the primary response agency, it has responsibility for implementing the airport emergency plan and ensuring that the appropriate rescue agency/agencies are formally notified of the possibility of an aircraft accident where there is a significant body of water. It is also the airport’s responsibility to develop a comprehensive notification network from the Air Traffic Control Tower to all response agencies. The airport operator has the responsibility to ensure the water rescue plan in place and referenced in the airport emergency plan is maintained, tested and updated.

- a. **Mutual Aid.** Because of jurisdictional or logistical reasons, an airport operator may need to develop a water rescue plan that consists of a written mutual aid agreement identifying an entity other than the airport to act as the primary response agency. Such agreements are typically signed with the local fire/rescue department, Coast Guard, Marine Police, Harbor Patrol, or National Guard. A water rescue plan may also contain additional signed agreements with private

entities, such as tug operators, ferries, marina facilities, medical helicopter services, crane operators, and construction or recovery crews.

- b. **Responders Identified and Involved in Exercises.** At certificated airports, where another entity will assume the role of the primary response agency, the airport operator **must** specify the responsibilities and duties in a written mutual aid agreement. In accordance with 14 CFR Part 139, the airport's emergency plan (including responders identified and involved in exercises) must be thoroughly reviewed periodically, (i.e., an annual tabletop and a full-scale exercise every 3 years). The airport operator **must** also periodically evaluate the airport water rescue component as part of either the annual tabletop or tri-annual, full-scale emergency exercise. **The role of mutual aid responders, whether they are the primary response agency or a support agency, is critical to the success of a water rescue plan. It must be noted that each of these agencies has their own primary mission. Fulfilling that primary mission may commit or relocate assets and personnel to events other than the aircraft accident/incident. Airport planners must factor in these contingencies when developing a water rescue plan.**

5. WATER RESCUE PLANNING.

5.1 Response Assignments. The water rescue plan **must** state what equipment and personnel actions **each** participating **agency** will be expected to provide and establish **which** agency will assume the primary response role. If the airport will not serve as the primary response agency, the airport operator **must** ensure this is specified in a mutual aid agreement as well as in the emergency plan. It **must** also clearly define in writing what it will provide to the primary support agency.

5.2 Support Inventory. The water rescue plan **must** include an inventory of what services, equipment capabilities, and facilities each agency will provide, and locations and plans for mobilizing personnel and equipment. The airport operator **must** maintain an inventory list and update it regularly to ensure that the necessary equipment and personnel are available. To the extent practicable, the plan **must** provide for the use of rescue vessels with enough combined capacity to accommodate the maximum number of persons that can be carried on board the largest air carrier aircraft that the airport reasonably can be expected to serve.

5.3 Incident Command. **The Incident Command System (ICS) must be established in accordance with AC 150/5200-31, clearly defined in the airport water rescue plan and used throughout the incident. The Airport Fire Department must provide a qualified representative to the Command Post. If the Airport serves as the lead agency for an aircraft accident in the water, the Aircraft Rescue Fire Fighting (ARFF) representative may serve as the Incident Commander (IC). If the lead agency is other than the Airport Fire Department, the ARFF representative must report to the IC to provide technical assistance and to serve as a liaison with the airport.**

5.4 Additional or Unplanned Assistance. The plan should recognize that recreational boaters who see the accident will want to rescue passengers in the water. In addition once news of the accident spreads, other members of the public might want to assist. Because they are not likely to be familiar with aircraft or experienced in emergency response, they may inadvertently increase the danger to survivors in the water and to themselves. It is very important to establish effective "absolute" control procedures to prevent their involvement in the rescue. When possible, **request** the Coast Guard to issue a **Notice to Mariners** to keep boaters out of the area once the ICS has been established.

Commercial vessels such as water shuttles, ferries and tugboats are resources that may be very helpful during rescue operations. These vessel operators must be considered as a resource and included in the water rescue plan.

5.5 Handling of Survivors. The plan **must** set forth practices and procedures for rescue of survivors from floating and/or submerged sections of fuselage. The airport operator or primary response agency **must pre-establish suitable casualty collection areas.** The selection of docking and landing areas **must be made, taking into consideration the following:**

- a. Routes through the airport proper might not provide the most direct access to hospitals with facilities appropriate for treating survivors.
- b. The ability to secure the site from intrusion by the public and the media.
- c. Have adequate space to accommodate triage, fuel decontamination, ambulance staging, ambulance loading, ambulance turn around, etc.
- d. Have dock heights compatible with rescue craft.
- e. Resources for addressing the incident may include floating docks and gangways, not ladders.
- f. Be illuminated for night operations, or include portable lighting equipment as part of the plan.
- g. Have sufficient draft to accommodate rescue craft being routed to this location at all tides.
- h. Have adequate turning basin to support docking and undocking of the rescue craft being routed to this location.
- i. Be located in an area that remains navigational during all weather conditions.
- j. Have a water supply to support decontamination operations, i.e., hydrants

5.6 Other Considerations. In addition to the items outlined above, the plan **must** address the following issues:

- a. Notification system for all agencies involved
- b. Jurisdictional authority or authorities for each required emergency service, (i.e.) Fire – Rescue, Law Enforcement, and Dive Teams
- c. Rescuer Accountability System: Accountability system to keep track of rescuers in the hot zone. Divers or rescue swimmers in the water, rescuers making entry to floating fuselage, etc. Establish a NIMS compliant accountability system utilizing accountability tags or another method. This must be harmonized with all response agencies which maintain constant awareness of the status and locations of all personnel working at the site.
- d. Memorandums of understanding (MOUs) or Letters of Agreement (LOAs) with response agencies with a role in the plan
- e. Response times
- f. Hazardous material, and/or other special considerations
- g. Personnel recall
- h. Security

- i. Traffic control
- j. Medical, rescue, firefighting services
- k. An inventory of specialized services and equipment
- l. Training
- m. Drills
- n. Triage
- o. Services for uninjured passengers
- p. Airline support
- q. Fatality management planning
- r. The resumption of normal operations
- s. Family assistance planning
- t. Environmental response, i.e. HAZMAT, pollution control, clean up
- u. Establish evidence collection areas (primary and alternate) on shore having capabilities for the management of evidence such as aircraft parts, personal effects, crash scene debris, etc.” Suitability requirements should include the following:
 - (1) Ability to support heavy equipment
 - (2) Ability to secure the area from intrusion by the public and media
 - (3) Have space to accommodate required functions (i.e., fuel decontamination, crane operations, truck loading, truck turnaround, etc.)
 - (4) Have sufficient draft and free board for barges
 - (5) Be lit for night operations or include lighting plan if not so equipped

6. TRAINING.

6.1 Designated Personnel. At airports that plan to provide water rescue, the rescue personnel are generally selected from among trained aircraft rescue and fire fighting and/or airport police personnel. Rescue personnel **must** receive additional training in rescue boat handling in the specific rescue craft used at the airport. Training must be provided by competent, **qualified**, experienced personnel. **Medical screening or questionnaires may help determine the appropriateness of certain assignments for personnel. Persons susceptible to sea sickness must not be assigned as a rescue boat operator or as a crew member. Training must include hazard recognition, the proper use of personal protective equipment and techniques for removing victims from the water and into various types of rescue craft as identified in the plan.** An example of personal protective equipment includes floatation devices, thermal protection clothing, and blood borne pathogen protection.

6.2 Topics for Training. The airport operator **must** ensure that its rescue personnel, mutual aid personnel, and any others expected to engage in water rescue activities are familiar with airport and water rescue planning, techniques, rescue boat handling skills, and victim handling procedures. **Victim handling procedures must include handling the victim while he/she is in the water, methods used to move the victim into various types of rescue crafts, and procedures for treatment once aboard the rescue craft.** The airport operator **must** also ensure that all airport rescue personnel or mutual aid personnel that may engage in any rescue swimming activities **must** be trained in rescue swimming. (**NOTE: Because of the potential danger involved, rescue swimmers must only be deployed as a last resort [i.e., row, throw and go (RTG)] by a competently trained person.**) Reference NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents, 2009 Edition*, Chapter 9 Water Search and Rescue, and NFPA 1006 *Standard for Technical Rescuer Professional Qualifications, 2008 Edition*, for recommended detailed operational level requirements. **NOTE: The NFPA does not certify people based on qualifications.**

This training **must** address the subjects in the basic outlines provided below:

a. **Boat Training**

- (1) Vessel maneuvering (i.e., operating a rescue boat in a crash environment)
- (2) Construction and characteristics of rescue boats
- (3) Propulsion systems
- (4) Vessel dynamics
- (5) Search patterns
- (6) Using specialized equipment during searches, i.e. spotlights, vessel-mounted Forward Looking Infra Red (FLIR) cameras, handheld Thermal Imaging Cameras (TICs)
- (7) Rescue planning
- (8) Ocean dynamics
- (9) Limited visibility
- (10) Recovery of persons in water/extrication skills, provide emergency medical care, first aid
- (11) Towing procedures
- (12) Rescue swimmer deployment
- (13) Identify types and quantities of lifesaving equipment carried **and their use**
- (14) Use of communication devices

b. **Rescue Swimming**

- (1) **Safety Fundamentals**
 - (a) Deployment considerations; tethering and tending of swimmers

- (b) Confined space and submerged space prohibitions
- (c) Environmental hazards/aircraft hazards
- (2) **Rescue Swimmer Equipment**
 - (a) Thermal protection and floatation aids
 - (b) Mask, snorkel, and fins
 - (c) Tethering systems
 - (d) Signaling/identification aids
 - (e) Water rescue helmet
- (3) **Communications**
 - (a) Hand, whistle, and line signals
- (4) **Immersion Hypothermia and Cold Water Drowning**
 - (a) Recognition and treatment
- (5) **Ocean Dynamics and Operating Near Aircraft**
 - (a) Waves, swells, and currents
 - (b) Fuel and HAZMAT contaminants in the water
 - (c) Dangers including debris field, partially submerged objects
- (6) **Physiological Aspects of Rescue Swimming**
 - (a) Respiration and circulation
 - (b) Alterations in breathing patterns
 - (c) Muscle cramps
 - (d) Importance of conditioning
- (7) **Swimmer Operations**
 - (a) Dressing and deployment skills
 - (b) Swim training
 - (c) Victim handling
 - (d) Recovery of conscious, unconscious, and panicking survivors

- (e) Line system
 - (f) Multiple victims
- c. **Rescue Divers – Underwater Operations.** Any structure such as an automobile or aircraft that enters the water has the ability to float for a period of time. If the aircraft is intact, it will float for a significant period of time, usually until water enters through an opening in the aircraft. After submerging, there may be survivable portions in the aircraft air pockets. Cockpit crews may be able to survive underwater for a limited period of time if they have donned their positive pressure oxygen masks prior to impact with the water. If available, qualified Rescue Divers may be able to affect rescue for victims trapped in the survivable area of the aircraft. Certain fire department forcible entry tools may work underwater. There may be limitations to the usable depth underwater.

7. INITIAL AND RECURRENT TRAINING.

The airport operator or primary response agency must develop a training Standard Operating Guideline (SOG) which outlines the initial and recurrent training program for water rescue. This SOG must include the topics from paragraph 6.2, Topics for Training, as they apply to the specific needs of the airports water rescue applications. Rescuers must conduct frequent marine-related exercises including use of the rescue craft and other equipment during different weather conditions and seasons. At least half of the exercises must occur at night or during seasonal inclement weather and/or winter conditions. A method for evaluation and demonstration of proficiencies achieved following initial and recurrent training must be part of the training program. This training and recurrent training as well as the documentation of demonstrated proficiency must be documented as per part 139.301.

8. SOURCES FOR WATER RESCUE INFORMATION AND TRAINING.

A partial list of sources, both public and private, for information and training related to various aspects of water rescue is given below. This list is not represented to be complete nor does it indicate the only sources for such training. It is provided only as starting point for information for emergency preparedness officials and does not represent an endorsement by the FAA. The information was current on the date of publication of this advisory circular.

Massachusetts Maritime Academy

101 Academy Drive
Buzzards Bay, MA 02432
Contact: Ed O'Brien
Ph: 508-830-5091
E-mail: obrien@mma.mass.edu
Website: <http://www.maritime.edu>

Lake Superior College

Fire Technology and Administration Courses
2101 Trinity Road
Duluth, MN 55811
Ph: 800-432-2884 (toll free)
Ph: 218-733-7600
Website: <http://www.lsc.edu/>

University of Missouri–Columbia

Fire and Rescue Training Institute
240 Heinkel Building
Columbia, MO 65211
Ph: 800-869-3476 (toll free)
Ph: 573-882-4735
Fax: 573- 882-0678
E-mail: frti@missouri.edu
Website: <http://www.mufrti.edu/>

United States Power Squadron

1504 Blue Ridge Road
PO Box 30423
Raleigh, NC 27622
Ph: 800-367-8777 (toll free)
Ph: 1-919-821-0281
Website: <http://www.usps.org>

Marine Rescue Consultants

2043 Westcliff Drive
Suite 108
Newport Beach, CA 92660
Ph: 714-966-6455
Website: <http://www.marinerescue.com>

Florida Public Safety

PO Box 1905
Sebring, FL 33871
Ph: 863-385-3888
E-mail: phcolby@FL-PS.org
Website: <http://www.fl-ps.embarqspace.com/>

Ocean Rescue Systems

PO Box 3423
Portland, ME 04104
Ph: 207-799-3299
Website: <http://www.oceanrescue.com/page3.html>

United States Coast Guard**The National Maritime Center Website**

4200 N. Wilson Boulevard
Suite 630
Arlington, VA
Ph: 703-235-0002
E-mail: ksmith@ballston.uscg.mil
Website: <http://www.uscg.mil/hq/g-m/nmc/web/index.htm>

- a. USCG Approved Fast Rescue Boats courses
Link: <http://www.uscg.mil/hq/g-m/marpers/examques/frb.pdf>

National Association of State Boating Law Administrators (NASBLA)

1500 Leestown Road, Suite 330

Lexington, KY 40511

Ph: 859-225-9487

Fax: 859-231-6403

E-mail: info@nasbla.org (for general information)

Website: <http://www.nasbla.org>

- a. NASBLA Approved State Boating Safety Courses

Link: <http://www.boat-ed.com/>

- b. NASBLA Approved Boating Safety Courses

Link: <http://www.nasbla.net/courselisting.php>

American Red Cross

Contact your local Red Cross office and ask for the Health and Safety Services Office for a full listing of swimming, water rescue, and boating courses.

Website: <http://redcross.org>

9. COMMUNICATIONS.

The planning and implementation of proper and effective communications for water rescue operations is complex. In an accident on an airport, it is the airport operator's responsibility to respond. However, in an aircraft accident in the water another governmental agency might provide incident command. In such cases the airport operator must quickly communicate to the primary response agency that an accident has taken place and dispatch airport representatives to the Incident Command Post.

9.1 Notification of Airport Rescue Personnel. Airport rescue personnel in the aircraft rescue and fire fighting station or water rescue substation **must** be notified of an aircraft in the water. Cross-trained personnel located in the terminal building or elsewhere on the airport **must** be notified by a reliable means of communication (i.e., pager, radio, or cell phone).

9.2 Notification of Mutual Aid Partners. A reliable voice and electronic communications system **must** be available between the airport and other official agencies or parties specified in the mutual aid agreement. The system may make use of telephone and/or radio technology. **A mobile or waterborne command post, if available, may enhance communications capabilities at the scene. An interoperable communications system is required when multiple agencies are operating at a single incident.**

- a. **The USCG has reserved Marine VHF-FM channel 16 frequency (156.800 MHz) as an International Distress, Safety and Calling channel. All ships required to carry a radio, the USCG, and most coast stations maintain a listening watch on this channel. If an airport operator has one or more vessels, it must ensure these vessels monitor this frequency. The Coast Guard Liaison and Maritime Safety Information Broadcasts announced on Channel 16 are read in full on VHF-FM channel 22 A (157.100 MHz). The USCG may assign emergency operations communications related to the water search and rescue event as well as security related functions to Channel 22 A or other channels at their discretion. Operating frequencies should be pre-determined with local Coast Guard sector or district for all response entities within the USCG area of responsibility.**

VHF-FM Channel 13, frequency (156.650) is an Inter-ship Navigation Safety (bridge-to-bridge) channel. Ships over 66 feet (20m) in length maintain a listening watch on this channel in US

waters. This frequency provides rapid communications to public safety vessels, harbor ferries, water shuttles, tugboats etc. Many marine radios have options for monitoring more than one frequency. Channel 16 and Channel 13 must always be monitored in a port or harbor where commercial vessels over 66 feet (20m) are operating.

- b. The emergency plan **must** address the establishment and location of a command **center** to direct rescue operations, as well as the method(s) of communication to be used.

9.3 Command and Control During the Rescue Operation. If other agencies, particularly the Coast Guard or Harbor Police, perform rescue operations, the airport operator will need to establish communications on a marine radio frequency with the primary response agency. This may require the airport operator to purchase marine radios or install marine radio channels in airport radios. In addition, the designation of a command post may be the prerogative of the primary response agency, and the airport operator **must** ensure that it is able to communicate with the designated **command** post.

9.4 Coordination. Rescue operations between rescue personnel on the water and on land must be coordinated to ensure that survivors are brought to the designated areas on shore for triage, decontamination, and surface transportation. **Accountability and tracking of rescue personnel and survivors is an essential component of the water rescue plan coordination. Rescue personnel must be monitored through a NIMS compliant accountability system, utilizing accountability tags or another method that is harmonized with all response agencies. A system to maintain accountability of survivors must also be established which is adopted and used by all agencies involved in the event.**

10. RESCUE VEHICLES AND EQUIPMENT.

10.1 Types of Vehicles.

- a. Vehicles used in conducting water rescue operations must be appropriate for the particular water environment involved. Collectively, they **must** have enough capacity to accommodate the maximum number of passengers carried by the largest type of aircraft serving the airport. To ensure the appropriate selection of water rescue vehicles for the specific airport, people responsible for acquiring these vehicles must consider seasonal weather variations and daily tide conditions (e.g., ice, wave height, surf conditions, water temperature, hours of daylight, prevailing winds, etc.).
- b. Normally, various types of boats will be the primary water rescue vehicles. Other vehicles may include helicopters, air cushion vehicles, and shallow draft "air boats." All rescue craft may have advantages and disadvantages. For example, water jet drive boats operate well in shallow water; but tend to intake floating debris. Amphibious and track vehicles may have some utility in swamp rescue operations. **Reference NFPA 1925 *Standard on Marine Fire-Fighting Vessels*, 2009 Edition, Chapter 4 Design Considerations, for guidance in selecting vessels.**
- c. **All boats need to meet USCG and American Boat and Yacht Council manufacturing standards.**

10.2 Use of Vehicles and Equipment.

- a. **Conventional Boats.** These vessels are useful for transporting rescue personnel and equipment, deploying flotation equipment, picking up survivors, firefighting, securing the scene, communications, etc. Some boats are designed for and may be used in the same manner as rapid intervention vehicles in conventional aircraft rescue and fire fighting responses.

- b. **Amphibious Firefighting Vehicles.** An amphibious firefighting vehicle capable of 25 to 30 mph (40-48 kph) on land and 8 mph (13 kph) in water can be useful for rough terrain, steep slopes, flooded areas, as well as for permanent, significant bodies of water.
- c. **Rescue Boats.** These fiberglass or aluminum-hulled boats may have inboard or outboard engines capable of speeds up to 60 mph (95 kph). Some of the boats are designed to allow for the removal of a section of the hull (freeboard) to provide easy access into and out of the water. The boats can vary in length from 17 to over 40 feet (5–12 m). Depending upon the size of the vessel, enclosed or at least sheltered accommodations may be available to protect survivors from the environment. It is important that the boat have easy access around most of the topsides to allow rescue personnel to deploy raft canisters or to assist survivors out of the water. Rescue boats **must** have 2 engines so if one becomes inoperable, the other becomes the back up.
- d. **Rafts/Flotation Platforms.** These platforms are simply large, inflatable rafts with netting draped over the side and all unnecessary equipment removed. They provide a highly buoyant means of keeping 10 to 45 people afloat until rescue craft arrive. The platforms **must** be provided with appropriate fittings to allow safe towing to shore. Care **must** be taken in attempting to tow aviation-type rafts because of their design. Rescue personnel will need to practice assisting victims into the platform because victims may be unable to board the platforms unassisted. Consideration **must** be given to deploying sufficient inflatable platforms. **Inflatable rescue platforms require maintenance and inspection by a USCG approved inspection station.**
- e. **Inflatable Boats.** Normally, these boats are very shallow draft vessels. They may be a rigid or a true inflatable boat with a diesel/gasoline powered propeller and/or water jet propulsion capable of traveling 30 to 50 mph (48–80 kph). Boats of 22 to 28 feet (6.6–8.5 m) will accommodate approximately 15 people. Inflatable boats provide the best ratio of vessel weight to passenger capacity. They can be swamped and still support survivors. Consideration **must** be given to deploying sufficient inflatable boats. **If inflatable boats are specified for water rescue use, consideration must be to those designed with separate compartments in the inflatable hull. Sharp or jagged metal on aircraft wreckage provides a hazard to inflatable vessels.**
- f. **Shallow Draft "Air Boat."** These boats can be 7 to 8 feet wide (2.1–2.4 m) and 13 to 20 feet long (3.8–6 m) and are propelled by aircraft or auto engines driving aircraft-like propellers. Larger models can carry approximately 2,200 pounds (1,000 kg) of people and/or water rescue and medical equipment. They can operate at speeds up to 50 mph (80 kph) in extremely shallow water, tidal flats, marshes, and snow. Shallow draft airboats, however, will sink if swamped. Also, these boats cannot go in reverse and never can be fully stopped. **Air boats are extremely noisy and provisions for clarity of communications may pose an issue if not addressed.**
- g. **Air Cushion Vehicles or "Hovercraft."** Rescue personnel can use hovercraft in the same manner as conventional boats. In addition, the hovercraft is an amphibious vehicle that can be used on ground, water, mud and any kind of service /and or floating obstacle. Larger models can carry 18 survivors. These vessels will usually have a higher response speed in calm waters. They are especially useful in very shallow water as well as on mud flats. **Smaller model hovercraft are less capable in traversing transitions in terrain and show significant reduction in speed operating into the wind or with moderate to severe chop.** However they can push jet fuel out from the vessel, which can cause an explosive mixture.
- h. **Helicopters.** Helicopters, and fixed wing aircraft in some cases, are most useful for transporting and deploying rescue personnel and equipment because they are faster than any surface vehicle. They are particularly useful for shuttling additional personnel and equipment to the scene

providing weather conditions are acceptable. Helicopters can also **provide spot lights useful in searches** and **can** assist **with** communications and secondary command post activities. Helicopters with infra-red capability can be particular useful for night activities. **Some helicopters have video downlink capability which may serve as a decision support tool for incident command.** However, they can disorient and frighten survivors in the water because of rotor noise and downwash, which can cause debris to become airborne. Helicopter operations in narrow rivers may be constrained by obstructions, trees, bridges, power lines, etc. If helicopters are to be used in water rescue operations, functions they can safely perform **must** be determined early in the planning process. Planners **must** not rely solely on helicopters for rescuing survivors.

- i. **Other Equipment that Must Be Available.** Area maps and navigation charts, bailing buckets, water pumps, blankets, bull horns, communications equipment, emergency lights, flares, forcible entry tools, marine night vision binoculars, life rafts (with oars or paddles), medical kits, navigational equipment, **medical equipment**, portable 500-watt or greater floodlights, rescue nets, stretchers/litters, rescue throwing bags, and anchors **must** be available and readily accessible.

10.3 Specific Applications.

- a. **Oceans or Large Lakes.** Coastal airport operators or their primary response agencies **must** consider boats to be their primary response vehicles. Helicopters that can be dispatched by the airport or secured from other agencies for the transportation of rescue personnel and/or flotation equipment are also of prime importance. Such airport operators **must** consider fast **rescue** boats capable of carrying **and deploying** the appropriate amount of flotation gear **such as inflatable rescue platforms.** **The plan must include a vessel with** some firefighting capability. **Additional required marine assets may include larger vessels** capable of taking survivors on board and providing other support such as medical, communications, etc.
- b. **Inland Waters.** Boats, inflatable, and/or air cushion vehicles may be the primary response vehicle at airports located adjacent to rivers and small lakes. Boats of appropriate size and capability **must** be available for immediate response. Airport operators **must** consider a relatively small, fast boat(s) capable of carrying the appropriate amount of flotation gear, plus having some firefighting capability and also a larger boat capable of taking survivors on board and providing other support such as medical, communications, etc.
- c. **Wetlands/Swamps.** Water rescue operations in swamps may call for shallow draft boats, "air boats," air cushion vehicles, helicopters; various track vehicles, and "high flotation" and/or amphibious vehicles. The swamp **must** be traversed or examined by air prior to selecting the appropriate rescue equipment.
- d. **Swift Water.** Rescue operations occurring in areas with rapidly moving water conditions will normally require the use of special watercraft. This watercraft can include inflatable and/or polyethylene hulled boats. They must have the ability to be transported quickly and be launched with the minimum amount of effort, preferably without access to a boat ramp. Before conducting operations in swift water, a risk assessment of the moving water conditions must be made as to the hazards to the victims and the rescuers. In certain instances, the use of a helicopter may provide an alternative rescue option. Swift water rescue presents significant unique challenges and hazards to rescuers and victims in the water. Specific swift water training must be provided in addition to the training described in Section 6.
- e. **Areas Subject to Freezing.** Bodies of water at some airports may require more than one plan based on frozen conditions in the winter. The airport operator's water rescue plan must be

developed to provide a realistic response to an aircraft accident in the water in all conditions and circumstances that can be reasonably anticipated.

11. UNITED STATES COAST GUARD RESCUE COORDINATION CENTERS

- a. Go to the USCG Home Page, Website address: <http://www.uscg.mil/USCG.shtm>.
- b. Search the Coast Guard website for: USCG Rescue Coordination Centers.
- c. The results of your query **will** provide you with a **phone number** for USGC Points of Contact.

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APPENDIX A. SAMPLE AIRCRAFT WATER RESCUE PLAN

A.1 INTRODUCTION. List Airport name, description, location, and operator. Identify by name, type, size, location and proximity of water hazards with distance and direction from airport.

A.2 PURPOSE. To promptly deploy water rescue equipment and crews in support of an aircraft accident or mutual aid assistance in or near bodies of water.

A.3 RESPONSE. Initial responders' reaction will be to follow the Water Rescue Plan as listed in the Airport Emergency Plan. Reference specific section and title of the AEP as well as Departmental Standard Operating Procedures or Standard Operating Guidelines.

- a. Describe the procedure for notifying airport personnel of an aircraft accident/incident occurring in a nearby body of water. First notification will generally be from the Airport Tower to the Airport Dispatch.
- b. Support Inventory: Identification of facilities, vessels, equipment, services, specialized teams, staffing and support that may be available to participate in a water rescue effort.

A.4 RESPONSE AGENCIES. Identify the agencies to be contacted in the order of priority as per the airport operators' Water Rescue Plan. Indicate who is responsible for notification as well as updates. Identify communications methods used (i.e.) Computer Aided Dispatch, automated call systems, manual calling, etc. Reference the appropriate appendix in the Water Rescue Plan which includes the primary and secondary contact numbers for each agency. Describe and record the frequency the list is updated, verified, and by whom, based on the requirements of the AEP.

A.5 STAFFING.

- a. Internal Airport Organization: List the individual's title and responsibilities (i.e., Water Rescue Captain, Boat Operations Officer, etc.). Reference Organizational Chart in Appendix.
- b. Composition: Include title for the individual member(s) in charge of water rescue equipment inventory, maintenance, inspection and replacement (further referenced in this sample document as "Water Rescue Commander"). Additional responsibilities include updating plans and agreements as well as tracking any changes in water rescue response areas, (i.e.) frozen channels, changes in navigational aids or response resources. Include a list of the members of the water rescue team that fulfill the required annual training and certification. Identify the members by category (i.e., rescue swimmer, dive rescue, swift water rescue, boat operations, ground support, etc.). Indicate any special qualification or requirement for each category or title.

Incident Command System (ICS): Include ICS flow chart(s) based on Memorandums of Understanding (MOUs), or Mutual Aid Agreements (MAAs). Refer to copies of agreements in Appendix.

A.6 OPERATIONS.

- a. Training: Identify each team's training requirement (i.e., First Responder certification, Boating Safety Course, water lifesaving course) and frequency. Reference the Department Standard Operating Procedures for training and demonstration of proficiencies. Initial and recurrent training should include the items identified in paragraph 6.2, Topics for Training of Advisory Circular 150/5210-13.

- b. **Water Rescue Equipment:** List water rescue equipment maintained in inventory required in water rescue operations. Include storage location, quantities, sizes, type, inspection, maintenance, testing and replacement cycles. Indicate that any personal equipment used (i.e., diving gear) must be approved for use by the Water Rescue Commander.
- c. **Boat Inspection Procedures:** Indicate the frequency each boat/rescue craft and stored equipment must be inspected (daily, weekly, and monthly) and the individual checks, and documentation method required. Include communication checks and the list of radio frequencies to be verified.
- d. **Vehicle Based Water Rescue Equipment Inspection Procedures:** Indicate the frequency that each piece of vehicle stored water rescue equipment must be inspected (daily, weekly, and monthly) and the individual checks, and documentation method required.
- e. **Victim Treatment:** The primary objective of the water rescue team is the rapid removal of victims from the water and transportation to the shoreline for proper treatment. Emergency treatment at the scene will be accomplished within the constraints of the incident situation. Identify the equipment required to be on scene (, i.e., blankets, oxygen bags, long boards, C-spine collars, etc.).

A.7 PROCEDURES.

- a. As in any emergency response the Incident Command System will be followed.
- b. Upon arrival on the scene, the Incident Commander (IC) will establish a Command and complete an initial assessment of the situation in order to determine the action to be taken and the response required.
- c. The IC will identify the location of the Command Post, either waterborne or land based, and the Water Rescue Operations Chief will operate on the water as needed until the incident is concluded.
- d. The IC working with available Command Staff must establish the Incident Action Plan (IAP) as soon as possible and communicate it to all personnel through appropriate Section Chiefs involved in the incident.
- e. **Survival Reference Section:** Include the typical or seasonal conditions of the water hazards within the water rescue plans response areas:
 - Water temperatures by season, with reference or link to Hypothermia survival tables.
 - Wildlife hazards to survivors and rescuers in the water or along shorelines.
 - Significant currents, speed of water, waterfalls, dams, tributaries.
 - Local hazards, (i.e.) High Voltage on instrument landing system (ILS) Piers, entanglement hazards, diving hazards, hazards to navigation.
 - Tide heights extreme high and low, cycle. Reference to tide chart locations.

A.8 RESCUE/RECOVERY ASPECTS.

- a. **Priorities:** The first priority for any responders must be to quickly locate and rescue survivors. The recovery of deceased victims and wreckage must never interfere with the job of rescuing survivors.
- b. **Legal Authority:** Indicate any legal requirements such as local Medical Examiner, state or Federal authority, foreign government, military restricted areas.
- c. **Recovery Equipment/Storage:** Indicate the number and location of body bags required for the size of the emergency as well as the location site for the deceased victims. The Law Enforcement Officer (LEO) Section Chief will coordinate security and preserve the dignity and respect of human remains.
- d. **Wreckage and Evidence:** Follow the Advisory Circular 150/5200-12, *First Responders Responsibility in Protecting Evidence at the Scene of an Aircraft Accident/Incident*.

Investigations into the causes of aircraft accidents are handled by the National Transportation Safety Board and or the Federal Bureau of Investigation. They generally do not have the resources for recovering large amounts of aircraft wreckage and usually rely on the aircraft owner's insurance company to hire a recovery team for these purposes.

A.9 POST RESPONSE.

- a. A Critical Incident Stress Debriefing (CISD) may be required and called in following any water rescue incident especially in the case of loss of life or significant injuries. Reference the appropriate CISD Department Standard Operating Procedure (SOP) and NFPA 1584, *Standard on the Rehabilitation Program for Members during Emergency Operations and Training*.
- b. All equipment must be cleaned, dried and inspected after each use and then placed back into service.
- c. Infectious control procedures must be observed. Reference the Department of Infectious Control Policy.
- d. As soon as possible after responders have been relieved, they must provide full accounting of the incident identifying actions, observations, concerns and recommendations. This information will be helpful during incident critique for the updating and revision of the Water Rescue Plan in AEP, MOUs, MAAs and during the investigation phase.
- e. Schedule after action critique with internal and external response agencies within 7 days.
- f. Update water rescue plans and procedures with lessons learned during incident critique.

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APPENDIX B. SAMPLE AIRCRAFT WATER RESCUE CHECKLIST

ITEM	DESCRIPTION	SPECIAL NOTES	REMARKS
1.	Describe body/bodies of water involved.	Type, approximate size, average depth, seasonal weather, climatic conditions (including ice, water temperatures, wave height, hours of daylight, prevailing winds). Include map(s), nautical charts with concentric rings indicating distance from airport. Identify runway designations and outer markers.	
2.	List name, address, and telephone numbers of each water rescue participant along with their qualification(s).	Must be verified and updated annually.	
3.	Notification of jurisdictional authority(s) (IC)*, based on location of incident.		
4.	Hazardous materials*, pollution containment.		
5.	Personnel recall*	Identify systems, manual or auto recall. Test auto systems at least annually, verify / update contact information	
6.	Security*		
7.	Traffic and access control*		
8.	Emergency Medical Services (EMS)*		
9.	ARFF*		
10.	Triage*		
11.	Firefighting*		
11.	Dive teams, rescue or recovery		
12.	Rescue Swimmers		
13.	Services, facilities for uninjured*		
14.	Airline support*		
15.	Air Support	Helicopter or fixed wing for search and rescue / communications plan for air support	
16.	Removal of deceased*	Mass fatality plan / coordination with Coroner's Office / Forensic Teams	

ITEM	DESCRIPTION	SPECIAL NOTES	REMARKS
17.	Family assistance plan*, Red Cross / Airline / Airport Plan		
18.	Resumption of normal services*,		
19.	Define incident command system, National Incident Management Systems (NIMS) Compliance		
20.	Describe incident response, recovery actions, procedures of ARFF, LEO, Airport Operations, EMS, public information.		
21.	Mutual aid agreements between airport, each response agency, and private companies; list each and describe responsibilities, equipment, etc. Identify agency in command based on location or other factors.		
22.	Air Traffic Control Tower (ATCT) role description		
23.	Sanitation services for extended operations		
24.	Drinking water, Rehab		
25.	CISD, Critical Incident Stress Debriefing Plan		
26.	Ropes, barricades, barrier tape for land side support, marine safety zone for incident location, search areas		
27.	Portable lighting, landside for docking, landing facilities / ambulance loading etc Agencies / vessels equipped with scene lighting.		
28.	Decontaminate equipment		
29.	Portable address system (PAS)		
30.	Communication equipment (cell phones, 2-way radios, etc.)		
31.	Communication protocols		
32.	Communication procedures		
33.	Mobile telephone banks		
34.	Marine band capability		
35.	Specific triage , passenger transfer site(s) by location		
36.	Agreements with commercial boat fleets / ferries / water shuttles		
37.	Specific fuel decontamination site		
38.	Location , plans for mobilizing personnel, equipment, staging areas		

ITEM	DESCRIPTION	SPECIAL NOTES	REMARKS
39.	Describe water craft by type, capacity, staffing, and equipment carried. Seasonal availability.		
40.	Nautical charts identifying response areas or zones. Limitations for rescue craft based on draft or special requirements.		
41.	Rescue boat facilities & locations. Limitations / weather, tide, access.		
42.	Establish specific docking/landing areas onshore. Considerations for this location, flexible float heights, ambulance staging, and road access.		
43.	Training for water craft operation, handling; rescue swimming, table top, triennial exercises when applicable	Minimum standards, frequencies, organizations or agencies providing training	
44.	Annual Review of Plan / Tabletop Exercise		

*policy + procedures

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APPENDIX C. LIST OF ACRONYMS

AC	Advisory Circular
AEP	Airport Emergency Plan
ARFF	Aircraft Rescue Fire Fighting
ATCT	Air Traffic Control Tower
CFR	Code of Federal Regulations
CGADD	Coast Guard Addendum
CISD	Critical Incident Stress De-briefing
COMDTINST	Commandant's Instruction
EMS	Emergency Medical Services
FLIR	Forward Looking Infra Red
FM	Frequency Modulated
HAZMAT	Hazardous Material
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IAP	Incident Action Plan
IC	Incident Command
ICS	Incident Command System
ILS	Instrument Landing System
LEO	Law Enforcement Officer
LOA	Letter of Agreement
MAA	Mutual Aid Agreements
MOU	Memorandum of Understanding
NASBLA	National Association of State Boating Administrators
NFPA	National Fire Protection Association
NIMS	National Incident Management Systems
NTSB	National Transportation Safety Board
PAS	Portable Address System
PFD	Personal Flotation Device
RTG	Row, Throw and Go
SAR	Search and Rescue
SOG	Standard Operating Guideline
SOP	Standard Operating Procedure
TIC	Thermal Imaging Camera
TRB/ACRP	Transportation Research Board/Airport Cooperative Research Program
USCG	United States Coast Guard
VHF	Very High Frequency

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