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**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

SURVIVAL FACTORS SPECIALIST'S FACTUAL REPORT

ATTACHMENT 1

HNL ARFF Marine Incident Standard Operating Guideline (SOG)

8 Pages

Honolulu International Airport ARFF Unit

MARINE INCIDENT

Standard Operating Guideline

SCOPE: This Standard Operating Guideline (SOG) is intended to be used as an operational guideline for ARFF personnel responding to marine incidents. It is also in direct support of ANNEX HIA-I, WATER RESCUE, in the Airport Emergency Plan which generally addresses the role of the ARFF Unit and the capabilities of other Airport agencies at a marine incident. This SOG gives ARFF personnel guidelines on expected hazards, response, staffing, and operations to specific water emergencies.

1. GENERAL FEATURES OF MARINE INCIDENTS AND CONSEQUENT RISKS

Every incident will be different but the following features may be found in each one.

- (1) Cold and Hypothermia for passengers and rescuers alike caused by water and wind and is not restricted to those who have been in the water. Persons on exposed shore may also become affected.
- (2) Areas of sea, or firm foreshore, or mud may change from any one to another surface during the incident.
- (3) The nearest land or shore may not be on the airport and may be some considerable road distance away.
- (4) Some incidents will have partly marine and partly land access.
- (5) Escape chutes from aircraft double as life rafts and it is intended that passengers would evacuate to, and remain on the chutes which can then detach from the fuselage.
- (6) Many resources which normally respond to a land based airport incident are inappropriate to a Marine Incident and vice-versa. Once the nature of an emergency is known, the response must be adjusted to adequate levels of appropriate resources.
- (7) Fuel which escapes from ruptured tanks and floats on water is a fire hazard which can still ignite. It is also a serious health hazard to passengers and rescuers, and can make handling objects extremely difficult.

- (8) Flotsam around an aircraft can include damaged baggage, cargo, aircraft parts, wires and cables. All of these can be a hazard to passengers, divers and the propulsion systems of boats.
- (9) Extrication equipment may need to be transported to the scene to free trapped persons.
- (10) The On-shore base for a Marine Incident will have many features at variance for that for a land-based emergency.
 - (a) Greater use may be made of helicopters. This necessitates firm control in their tasking, traffic control and separation from command/conference areas. Noise can impede other actions and rotor-wash can fly debris as well as dust.
 - (b) The Triage area will have to have good inward access from the incident, and also good outward access for those triaged.
- (11) A relatively small area may have considerable length of coast and significant resources may be necessary for an effective search.
- (12) Because of tide and wind, survivors may be recovered at points which are considerable distances apart by road.
- (13) An early priority after rescue will be the recovery of flight data recorders and cockpit voice recorders which are in bright orange containers.

2. SAFETY & HEALTH

- (1) Rescue procedures after an aircraft accident in a marine environment have an exceptional level and range of hazards. Every person involved in such an incident, must at all times be assessing these hazards.
- (2) No action should be undertaken unless the risk of the action is balanced by a probable worthwhile result.
- (3) All ARFF personnel engaged in any marine incident shall wear an approved Personal Floatation Device (PFD).

3. RESPONSE GUIDELINES FOR AIRCRAFT IN THE WATER

3.1 Discussion:

- (1) The initial objective is to rapidly provide flotation and/or physical support to survivors so that the lengthy process of retrieval and transport to Triage can be carried out subsequently. First vessels to arrive may deploy life

rafts to support large numbers of survivors, and then commence the retrieval once initial support has been provided to all.

- (a) Experience shows that if rafts are deployed, tied together in a "daisy-chain" they provide a good target for survivors, and do not disperse with the wind.
- (2) The retrieval process can be from many positions, to many forms of transport. The following examples are not exhaustive.
 - (a) From floating escape chutes.
 - (b) From the water .
 - (c) From sandbars,
 - (d) From soft mud.
 - (e) From inside aircraft fuselage either partly or completely submerged.
 - (f) From an aircraft partly on land and partly in water/sand.
 - (g) From coral reefs
 - (3) If divers are considered for extrication of persons from the aircraft, this must be attempted only with full regard to safety and the hazards from objects which may trap the divers. Only staff with a high level of professional skill should be tasked. The ARFF Officer in Charge will fully assess the situation before committing divers.
 - (a) If the aircraft is submerged, early indications of the surface location should be marked by buoy and logged by GPS position as soon as available.
 - (4) Triage is as essential as at any other type of incident, but it is generally impractical to perform triage at any other place than the "landing point" where persons are brought ashore.
 - (5) Coordination of search, rescue and retrieval will be most difficult. There will need to be controlled tasking of resources to areas of need, but an element of individual flair and intuitive action by crews and individuals will still be necessary within the overall plan.
 - (6) A night incident will be more difficult. Illumination by helicopter floodlights is a valuable resource which must be controlled. Research shows best search results with helicopter at 100 ft. above surface, behind and to one

side of search vessels, with "footprint" of the light just ahead and to the other side.

- (7) As the incident develops, traffic can become two-way, with persons being brought ashore by all types of craft, and equipment and persons with special skills being taken to the site.
- (8) Portable extrication equipment can be transported to a site and operated there by either compressed air cylinders or small engine power.
- (9) Communications can be difficult. The information from Aircraft, boats, airport units and agencies can be passed only by radio. The need for coordination and sharing of information becomes even more important.
- (10) A marine incident will involve initial action crews for longer than a land based incident. The onset of exhaustion and exposure can be more rapid. Crew relief may be required very early.

3.2 Response Procedures

- (1) Upon receiving notification from the Tower that an aircraft is in the water, the ARFF Communications Center Operator shall gather as much information as possible to determine the exact location and number of passengers involved. Immediate notification of the Coast Guard will be made after all the information has been received from the Tower.
- (2) The HIA ARFF Unit will assume operational control of the incident until relieved as per the Airport Emergency Plan.
- (3) Response to the incident shall be made with the vessel most appropriate for the incident. In most cases the 32' Rescue Boat from Station 2 would be the most suitable.

3.3 Incident Operations Procedures

- (1) All ARFF vessels shall operate under the command structure established by the jurisdiction having control of the incident.
- (2) To the greatest extent possible, all vessels except the inflatable shall be staffed with three qualified persons. The inflatable shall be staffed with two persons.
- (3) All crew members shall wear an approved personal floatation device.
- (4) **Enroute Planning** - The following steps should be accomplished as the vessel is enroute to the incident scene:

- (a) All hands are briefed on the anticipated situation. A concept of operations is developed and duties are assigned.
- (b) Life rafts, floatation devices, and rescue equipment are prepared for deployment or use.
- (c) Any rescue swimmers/divers dress out as required.

(5) On-Scene Operations

(a) GOALS

- (1) To rapidly deploy floatation devices to as many people as possible.
- (2) To transport victims to the Triage area.

(b) ACTIONS

- (1) Determine the risk level of approaching a group of victims. If the risk of injury to either rescuers or victims is great, the prudent action may be to keep space between the rescue vessel and the victims.
 - (a) A large group of panicked persons may attempt to board the boat simultaneously. In doing so they could pose a threat to vessel stability.
 - (b) Rotating propellers may pose a danger to partially submerged or unseen victims.
- (2) If the situation requires the rescue boat to keep some distance from the victims, the following techniques may be used:
 - (a) From a position upcurrent (or upwind) of the victims, release inflated life rafts or floatation devices. Be aware that:
 - [1] Victims will tend to drift at a similar rate to the lifesaving devices, and may, if unable to swim, be prevented from reaching them.
 - [2] Injury or shock may prevent victims from reaching the lifesaving devices.
 - [3] Victims who have reached a floatation device may still require immediate medical attention.

- (b) Tethered PFDs (i.e. throw ring with attached line) may be tossed into the water where one or more victims may grasp them and be pulled to the boat.
- (3) If the situation allows the boat to close within close proximity of the victim or victims, the following techniques may be used:
- (a) Great care must be taken while maneuvering. Prudence may dictate that the engine or engines are shut down completely.
 - (b) Floatation devices are deployed.
 - (c) Victims grasping tethered floatation devices are pulled to the boat.
 - (d) Free-floating victims are pulled into the boat.
 - (e) Victims are transferred from floatation devices to the boat.
 - (f) Floatation devices may be towed by the rescue boat, although great care must be taken to ensure that no persons are lost enroute to the triage site.
 - (g) Rescue swimmers are to be used only when all other options for victim extraction have been exhausted.
 - (h) **DECEASED VICTIMS**
 - [1] Although they shall be treated at all times with dignity, the deceased are a last priority for extraction from the water.
 - [2] Deceased persons trapped in wreckage shall not be disturbed or removed unless such instructions are received from competent authority.
- (c) **HEAVY WEATHER CONDITIONS**
- (1) Bad weather conditions, especially wave height, may preclude the operations of one or more rescue boats. The incident commander shall make this determination.
 - (2) During high seas, the boat operator should avoid taking beam seas during such evolutions as victim extractions or boat transfers. These are best accomplished by keeping the bow into the seas.

(d) REDUCED VISIBILITY/NIGHT OPERATIONS

- (1) The 32' Rescue Boat from Station 2, because of radar capabilities, is best suited for safe operation in reduced visibility and at night.
- (2) Strobe lights should be energized during reduced visibility operations.
- (3) Special care must be taken to abide by the Navigation Rules, particularly those regarding safe speed.

(e) EXTRACTION OF VICTIMS FROM WRECKAGE AND FUSELAGE SECTIONS

- (1) Victims clinging to floating wreckage, excluding those within the interior of fuselage sections, should be extracted from the water using standard procedures. Care should be taken to avoid colliding with wreckage or fouling screws when approaching such wreckage.

(2) Fuselage Section Entry

- (a) Rescue swimmers are neither required nor expected to enter fuselage sections.
- (b) Dive Teams are best prepared to enter fuselage sections, both floating and submerged. Nonetheless, such action is inherently dangerous.
- (c) Incident Commanders must take great care to ensure that sufficient resources, including backup divers, are present before the commencement of fuselage entry operations.

(f) HELICOPTER OPERATIONS

- (1) The Incident Commander shall request the assistance and support of air resources as needed. He/she shall be responsible for determining, securing and marking an appropriate site for landing helicopters.

4. VESSELS IN DISTRESS

- (1) Vessels that are in distress and still seaworthy may be towed to the Coast Guard facility at Sand Island only. The ARFF Communications Center Operator shall notify the Coast Guard of all responses to vessels in distress.

- (2) Under no circumstances are submerged or partially submerged vessels to be moved. Victims are to be removed by standard procedures and transported to Station 2 where they may be met by security and medical personnel. A GPS reading will be taken on all submerged or partially submerged wreckage and communicated to the Coast Guard.

5. FIRE FIGHTING OPERATIONS

- (1) Upon notification of any shipboard fire, the ARFF Communications Center Operator shall notify the Honolulu Fire Department and Coast Guard. All ARFF marine resources are to be used in a supportive role only.

6. HAZARDOUS MATERIALS SPILLS

- (1) Upon notification of any HAZMAT spill, the ARFF Communications Center Operator shall notify the Honolulu Fire Department and Coast Guard. All ARFF marine resources are to be used in a supportive role only.

7. MEDICAL RESPONSES

- (1) Limited medical supplies are available on each rescue vessel.
- (2) Rapid transport of victims from the rescue vessel to the triage or EMS staging area is the goal. Victims should be kept warm and emergency first aid given as expertise and staffing allows.

8. NON-AIRCRAFT MUTUAL AID ASSISTANCE

- (1) ARFF marine resources may be requested by mutual aid organizations. Incident Commanders may respond to such requests provided that the airport is not left at an unsatisfactory readiness level.

10. This instruction is effective upon receipt.

James Kalawa, Fire Chief