

## Chapter 5. TABLE OF CONTENTS

	Page
500 Emergency Care Component.....	5-3
501 General.....	5-3
510 Emergency Care SAR Personnel.....	5-3
520 Emergency Care Services.....	5-3
521 Survivor Emergency Care.....	5-3
530 Evacuation and Transport Facilities.....	5-3
531 Selecting Transport Facility.....	5-3
532 Transport Facility Equipment.....	5-4
533 Transport Facility Types.....	5-4
534 Ambulances.....	5-4
540 Fixed Medical Facilities.....	5-5

## Chapter 5. SEARCH AND RESCUE EMERGENCY CARE

### 500 EMERGENCY CARE COMPONENT

#### 501 General

Emergency care supports the SAR system by providing four major capabilities:

(a) SAR personnel trained in emergency care.

(b) Lifesaving and life-sustaining services to survivors after rescue.

(c) Survivor evacuation and transport facilities.

(d) Medical facilities to receive injured survivors.

### 510 EMERGENCY CARE SAR PERSONNEL

SAR personnel who are trained in emergency medical care can provide lifesaving services to injured survivors at the distress scene. In addition, these personnel provide life-support and life-sustaining services during survivor extraction from wreckage, evacuation from the distress scene, and transport to a receiving medical facility.

SAR personnel assigned as crewmen to various search and rescue units must be qualified to administer basic lifesaving first aid to survivors at the scene.

When it is known that a rescue craft will be dealing with injured or seriously ill persons, the most medically competent personnel available should be added to the crew. Ideally this means that, in such cases, every effort should be made to send a doctor as part of the crew. If a doctor is not available, then other trained medical personnel should be used such as: corpsmen, paramedical personnel, or specially trained emergency care SAR crewmen.

### 520 EMERGENCY CARE SERVICES

#### 521 Survivors Emergency Care

Injured survivors are provided with lifesaving and life-sustaining emergency medical care

according to the competence of SAR personnel involved. The capability to sustain the life of those who have been rescued is just as important as the searching for, and rescuing of, survivors. The obligation to the survivor is not terminated until the survivor is safely delivered to an appropriate medical facility when necessary. SAR personnel fulfill these obligations to injured survivors by administration of on scene first aid, by en route lifesaving and life-support activities when personnel have been trained for such care and adequate equipment is available, and by delivering injured or ill survivors to an appropriate medical facility or an ambulance for further transfer to such a facility.

### 530 EVACUATION AND TRANSPORT FACILITIES

Survivors must be evacuated from the distress scene, transported, and delivered to receiving medical facilities or safe delivery point. Often the rescue facility is also the transport facility. However, under some circumstances an additional facility is necessary, either to speed suffering survivors to a medical facility or to provide better emergency medical care en route, or both. Examples of such instances are: Survivors are rescued from the water in a state of shock by a boat and then delivered to a helicopter for faster transportation; a ground party finds survivors from an aircraft crash and a helicopter with a doctor aboard is dispatched to evacuate the injured; a merchant ship rescues survivors from a ship afire at sea and another merchant ship with medical facilities and doctors aboard is diverted to remove and hospitalize the injured.

#### 531 Selecting Transport Facility

When a choice is available, there are four areas that should be considered by the SMC when selecting or requesting appropriate survivor transport facility:

(a) The medical training or qualifications of its crew or attendants.

(b) Its capability to reach the survivors in the shortest possible time, unless already on scene.

(c) The emergency medical equipment installed in the facility which can be used to stabilize the victim's injuries and other conditions upon arrival on scene, and to sustain their stabilization during transit.

(d) Its capability for transporting the survivors in a manner that neither aggravates the survivors' injuries nor produces new injuries or medical complications.

## **532 Transport Facility Equipment**

The type and quality of the specialized medical equipment required for life-support and life-sustaining measures aboard each craft basically determines its suitability as an emergency medical care transporting vehicle.

## **533 Transport Facility Types**

The facilities used to place SAR personnel at the distress scene who are capable of administering emergency medical care are usually primary SAR units. The facilities dispatched to evacuate and transport injured or seriously ill survivors from the distress scene to the receiving medical facility may be ambulances, ground vehicles of any type, helicopters, fixed-wing aircraft, medical evacuation aircraft, and marine craft. With the exception of ambulances, the capabilities and limitations of the above types of transport facilities are discussed in chapter 3.

## **534 Ambulances**

### **a. General**

Ground transportation of injured survivors is usually accomplished by the use of ambulances when helicopter transportation is not available, and ambulances can reach the scene. There are several possible sources of ambulance services, all of which can be grouped into five categories:

1. Morticians ambulance service.
2. Volunteer ambulance service.
3. Commercial ambulance service.
4. Public ambulance service.
5. Military ambulance service.

These ambulance services are the major

sources for providing ground vehicle transportation of survivors from a distress scene to a safe delivery point or medical facility. However the degree to which each of these ambulance services can support en route life-sustaining efforts varies greatly.

### **b. Morticians Ambulance Service**

Morticians were originally pressed into the ambulance service because their hearses were the only available vehicles capable of transporting people in a prone position. Nearly half of all ambulances in the United States are operated by morticians. However, most morticians' ambulances are not fully equipped for necessary communications or for extensive life-support efforts. Mortician ambulance attendants are usually not well trained in emergency medical care.

### **c. Volunteer Ambulance Service**

Volunteer ambulance units are financially supported by local community or volunteer contributions. Their equipment is usually well maintained and the state of training of their personnel is well above average. They are community oriented and frequently operate in conjunction with local police or fire departments. However, many of these volunteer ambulance services do not maintain a 24-hour alert status.

### **d. Commercial Ambulance Service**

The quality of commercial ambulance service varies widely. The quality usually depends upon how active the ambulance service is. Generally the more trips per day the service makes, the more profitable will the business be and the higher the quality of its equipment.

### **e. Public Ambulance Service**

Ambulance services under the direct control of local governments are usually adequately equipped with life-sustaining medical equipment, trained attendants, and a high rate of responsiveness for rapid dispatch. However, some communities have established public ambulance services with other public functions such as police, fire, or rescue duties, and a dual purpose vehicle is used. In the event of conflicting requirements for its use, the vehicle may not be available as an ambulance.

#### **f. Military Ambulance Service**

Military ambulances are normally manned with well-trained attendants, and are usually equipped with adequate life-support equipment, but not communication equipment. Some field type ambulances do not have adequate life-support equipment and function only as a bare transportation service.

### **540 FIXED MEDICAL FACILITIES**

Fixed medical facilities are emergency medical care centers, general hospitals, private hospitals, clinics, sanitariums, and first aid stations.

Military and U.S. Public Health Service hospitals and clinics provide medical advisory services to the SAR system. They function as survivor receiving hospitals only for those persons authorized to be admitted. Generally this is lim-

ited to military personnel and their dependents, plus merchant marine personnel and certain governmental officials. However, where civil hospitals are not available, these military hospitals and Public Health Service hospitals will admit civilian patients for emergency treatment.

The SMC selects the type of medical facility to receive injured survivors delivered from the distress scene. The hospitals and emergency care facilities available to the SAR coordinator will vary widely in their capacity for handling a number of survivors, and in the quality of treatment that may be administered to the survivors. Since most definitive care medical facilities are outside the SAR system, no effort will be made to discuss their detailed equipment or qualifications.

## Charter 6. TABLE OF CONTENTS

	Page
600 Documentation Component.....	6-3
610 SAR Logs.....	6-3
611 Case Numbering Log.....	6-3
612 SAR Operations Log.....	6-3
613 Case Narrative Log.....	6-4
614 RCC Diary.....	6-5
615 Information Case Log.....	6-5
620 SAR Forms.....	6-5
621 SAR Mission Forms.....	6-5
622 SAR Message Forms.....	6-5
623 SAR Liaison Forms.....	6-6
630 Folders.....	6-6
631 SAR Case Folder.....	6-6
632 Information Case Folder.....	6-6
633 SAR Mission Briefing Folder.....	6-6
634 SAR Unit Briefing Folder.....	6-6
640 SAR Charts.....	6-7
641 SAR Mission Chart.....	6-7
642 SAR Mission Overlays.....	6-7
643 SAR Unit Charts.....	6-8
650 Administrative Reports.....	6-8
660 SAR Case Studies.....	6-8

## Chapter 6. SEARCH AND RESCUE DOCUMENTATION

### 600 DOCUMENTATION COMPONENT

SAR documentation supports the SAR System, and is comprised of SAR mission logs, forms, folders, charts, and reports. Detailed documentation is required during the prosecution of all SAR missions. Documentation has many purposes including: compliance with ICAO Standards and Recommended Practices as well as Federal Governmental requirements; insuring that all necessary operational steps have been completed; countering civil liability suits by official, chronological records of a complete mission; compiling statistical data for mission or SAR System analysis; providing an information source if a future mission involves the same craft or person; and establishing the activities of the RCC for review by senior commands, congressional inquiry or other appropriate inquiries. Required documentation includes the SAR operations log, incident processing forms, SAR mission charts, and SAR unit charts. In addition, various SAR reports may be required by the SAR coordinator or by a senior SAR coordinator. The remaining logs, forms, folders, charts, and reports suggested in this chapter are administrative in nature, and their use is not mandatory for a SAR coordinator unless he desires to adopt them for his RCC. The documentation component detailed in this chapter, has proven to be suitable by several SAR coordinators in meeting their responsibilities. Regardless of the extensiveness of documentation adopted by a SAR coordinator, excessive duplication of entries is never required or desirable.

For purposes of documentation, a SAR mission is defined as any situation which results in the dispatch of SAR facilities and a SAR case is defined as any situation about which a unit opens a documentary file whether or not SAR facilities are dispatched. Accordingly, SAR case is a generic term which includes SAR mission.

### 610 SAR NUMBERING LOGS

#### 611 Case Numbering Logs

##### a. Case Numbering

Every SAR case must be assigned some form of case number and a title in order to permit ready reference to it. The case numbering log provides a system for keeping track of cases chronologically. The number and title is normally assigned as soon as the SAR System is notified of an emergency situation. The numbering system employed may be a simple chronological number commencing 1 January of each year or it may be a more detailed numbering system showing such things as date started, participating SAR coordinators, and other information. The Regional SAR coordinators specify which system subordinate SAR coordinators will employ for numbering SAR cases. SAR case numbers are maintained primarily for statistical recording of ROC activities.

##### b. Case Titling

The case title is composed of two parts: first, the identification of the craft, individual, or event; second, the nature of the emergency in a one or two word description. Sufficient information is provided in the title for an immediate understanding of the nature of the situation. Figure 6-1 depicts some examples of standard U.S. case titling.

### 612 SAR Operations Log

Each RCC shall maintain an accurate and complete record of their operational activity in a SAR operations log. This log shall be in a form of a chronological narrative account of all matters affecting the SAR cases prosecuted by the RCC. This log may be permanently bound or loose leaf. Many SAR coordinators have found that making log entries such as routine ROC administrative matters and non-SAR operational matters tends to obscure entries per-

### Typical SAR Case Titles

Identity	Nature of difficulty
Aircraft: operator, call sign, type	
BOAC SPEEDBIRD 392, TRIDANT USAF NUTBUTTER 5, KB-50 USN 7026, P-3C TWA 843, BOEING 707 MAC 4139, C-5A	NO COMMS #4 FEATHERED ELECTRICAL FIRE CRASHED OVERDUE LOST SOS MAYDAY IFF/SIF 3-7700 BAILOUT
Private boats: size, type, name, or number	
24' C/C GOOF UP 16' S/B BREEZY 14' O/B NY-5079AC 53' YACHT GOTROCKS 35' SLOOP JENNY	OVERDUE DISABLED SINKING SUNK AFIRE MEDICO LOST AGROUND EXPLOSION CAPSIZED COLLISION REMOVAL DEATH LOST TOW ADRIFT FLOODING MEDEVAC SOS MAYDAY
Merchant vessels: name, call sign, and nationality in parentheses	
M/V CONVENIENCE/5LRB (US) TUG GENEVIEVE McQUEEN (US) M/V ROMER/SPTH (PO)	
Government vessels: name, type, call sign	
USS BRASSHAT (DD-538) NQRZ	
Miscellaneous:	
HUNTER CAVER HIKER SWIMMER HURRICANE EARTHQUAKE	OVERDUE INJURED LOST DROWNING STRANDED (hurricane name) (earthquake location)

FIGURE 6-1

taining to specific SAR missions. In these situations they have adopted a case narrative log as a supplementary part of the SAR operations log. When this option is authorized by the SAR coordinator the only entries required in the SAR operations log are the case opening entry at the beginning of a SAR case and the case closed or case suspended entry at the conclusion of the SAR case.

### 613 Case Narrative Log

The case narrative log is a looseleaf record containing a chronological narrative of all matters affecting one SAR case. Separate case narrative logs are kept for each case and are usually filed in the SAR case folder. When case narrative logs are employed by an RCC, they are considered as an official part of the SAR operations log, even though filed in a different place. Examples of the types of entries main-

tained in a chronological narrative account are: date-time of mission opening and title assigned, summary of pertinent phone calls made and received, release and receipt of mission situation reports, movements of SAR units, emergency phase classifications, commencing and ending of preliminary communications check and extended communications check, offers and requests for assistance from others, and similar detailed information. Specific items that are recorded on incident processing forms or check lists need not be duplicated in the case narrative log, as long as the check lists and incident processing forms are filed with it.

## 614 RCC Diary

The RCC diary is a summary of cases which may be used to brief the SAR coordinator and his staff on SAR missions which have occurred within his area during a single 24-hour period. It is usually kept from midnight to midnight local time. The RCC diary includes: a short paragraph summarizing the actions taken, SAR units participating, and current status of all SAR missions in progress during the 24-hour period. In RCCs with a large mission load, only major missions are summarized in paragraph form. Minor missions are merely tabulated as to total number and types.

## 615 Information Case Log

RCCs receive information on missions being conducted by other SAR coordinators, from craft encountering difficulties which may develop into an emergency but for which no assistance is currently required, or from persons reporting unusual information. In order to more efficiently monitor these circumstances for possible SAR action, some SAR coordinators have also established a separate information case log for entries of this nature, and in addition have established a separate information case folder for each situation.

## 620 SAR FORMS

### 621 SAR Mission Forms

SAR mission forms are employed by the SMC, OSC, and SRU commanders to insure that complete and professional consideration is given to all required steps and events occurring

throughout the SAR stages of a mission. Generalized mission forms and checklists contained in this manual should be modified as required to fit local RCC activities.

#### a. Incident Processing Forms

The incident processing forms are used to record the immediately available information concerning any emergency incident which may develop into a SAR mission. Incident processing forms serve a dual purpose by providing an easy to follow sequence for obtaining essential information on an incident, and insuring that the informant may be recontacted at a later time should additional questions arise.

#### b. SAR Mission Checklists

Used to insure that a step-by-step course of action is followed in prosecuting SAR missions.

#### c. Search Planning Forms

Used to develop an efficient and attainable search action plan.

#### d. Search Action Forms

Used by the SMC, or briefing officer, to insure that SRUs and OSCs are briefed and debriefed on mission details.

#### e. Rescue Planning Forms

Used to develop a suitable and attainable rescue action plan.

#### f. Delivery Planning Forms

Used for considering various factors that influence delivery planning and emergency care.

## 622 SAR Message Forms

SAR message forms are used by the SMC, to reduce time required to draft and release common standard messages.

#### a. Marine Information Broadcast Form

Used to alert all vessels near or approaching the scene of an emergency. Commonly referred to as an "All Ships Message".

#### b. Notice to Mariners Form

Used to initiate a Notice to Mariners in order to routinely inform them either of unsuccess-

ful SAR missions of which there is a remote possibility that survivors may still be adrift, or of menaces to navigation that may have developed from the circumstances of an incident, such as a vessel sinking in shallow waters hazarding other vessels.

**c. Enroute Aircraft Alerting Form**

Used to request ARTCC or OATCC to alert enroute aircraft on instrument flight rules (IFR) flight plans that are near or approaching the scene of an emergency.

**d. Notice to Airmen Form**

Used to initiate a Notice to Airmen to inform them of SAR operations which may either hazard their flight or which request their assistance, such as monitoring of distress frequencies for survivor signals.

**e. Sample SAR Message Form**

Used to provide SMC and RCC Controllers with sample, canned messages for aid in drafting common SAR messages.

**623 SAR Liaison Forms**

Used by the SAR liaison officer or SMC when deployed to another RCC, RSC, or staging base to assist in accomplishing SMC duties.

**a. Deployed SMC Team Checklist**

Used to organize an SMC team when deployed to a staging base.

**b. SAR Liaison Officer Checklist**

Used to insure that a deployed SAR liaison officer is equipped to accomplish his duties.

**630 SAR FOLDERS**

**631 SAR Case Folder**

The SAR case folder is a convenient and efficient system for monitoring the progress of a case by keeping together all logs, forms, messages, and other data which pertain to one case. SAR case folders usually contain on one side a copy of all incoming and outgoing hard copy message traffic and on the other side contain the incident processing form, checklists, planning forms, action forms, briefing and de-

briefing forms, penciled notes pertaining to the mission, and the case narrative log. These folders may either be plain manila folders or specially printed, color-coded folders with the RCC's incident processing forms printed upon them in addition to a SAR message addressee block for keeping track of action and information addresses of SITREP and SAR action plan messages released by the RCC.

**632 Information Case Folder**

The information case folder is a convenient and efficient system for monitoring those incidents where missions are being conducted by other SAR coordinators or which may develop into a SAR mission. Information case folders usually contain all message traffic and other information pertaining to a single situation.

**633 SAR Mission Briefing Folder**

Used by the mission briefing officer to brief departing SAR units and to debrief returning SAR units. This folder is usually only required during missions involving a large number of SAR units. Upon the SAR unit's return and debriefing, the completed SAR unit briefing form, SAR unit debriefing form, and OSC briefing form are filed within it instead of in the SAR mission folder. It contains a summary of the overall SAR mission progress to date, the action plan for the particular operational stage that the SAR unit will be participating in, and the specific detailed requirements which the particular SAR unit will be executing during his sortie.

**634 SAR Unit Briefing Folder**

The SAR unit briefing folder is used mainly during large scale extended SAR cases by the SMC or SAR briefing officer to insure that the SAR unit has in its possession throughout its sortie, a detailed summary of the mission, latest sortie requirements, and procedures to observe en route, on scene, and upon return from his sortie. The following is a list of possible items that have been included by some SAR coordinators in their search craft briefing folders.

Search briefing checklists.

Search craft briefing form.

Arriving search craft information required by OSC.

OSC's initial briefing to search craft.  
Search aircraft descent procedures.  
Aircraft operations normal reports.  
Sighting reports.  
Survivor sighting procedures.  
Survivor relocation procedures.  
Diverting merchant vessels to distress scene.  
Shipboard lookout briefing.  
Aircraft scanner instructions.  
Aircraft scanner briefing.  
Distress and emergency signals.  
Correction to track table for aircraft.  
U.S. buoyage table.  
SAR vessel planning data.  
Common sailboat rigs.  
Aircraft departure via OSC position.  
Aircraft departure via assigned search area.  
OSC procedures.  
OSC search status checklist.  
Search craft debriefing form.  
Most recent search action plan message.  
Most recent AMVER SURPIC if oceanic search.  
Prepared search area chart.  
Rough sketch of all search areas.  
Prepared aircraft clearance form.  
Prepared in-flight meal request form.  
The search craft briefing folder may be reused for numerous searches upon replacement of the search craft briefing and debriefing forms after each sortie.

## 640 SAR CHARTS

### 641 SAR Mission Chart

SMCs must keep a SAR mission chart for every search mission. It is also helpful in most rescue missions for determining such things as access routes, suitability of terrain, etc. All pertinent information obtained from the incident processing form is plotted on the SAR mission chart. This includes such things as proposed trackline of a missing craft, its last known position, its estimated position at time of last radio contact, the search areas for the initial search effort, and other appropriate information which may have a geographic importance for that mission. At a convenient place on the chart the following information is usually listed for assisting the SMC in evaluating his prosecution of the search effort: mission number and title,

type of search—day or night, date, search area designations, search units assigned each area, actual probabilities of detection obtained upon completion of each search area, and total size of area searched in square miles. As each assigned search is completed, it is cross-hatched to indicate the exact area searched. The following color code has proven effective when plotting on SAR mission charts and overlays:

- (a) Search area boundaries and all lettering—black.
- (b) Last known position, last communications position, planned track of distressed craft, and objects sighted—red.
- (c) Search craft's tracks—blue.
- (d) Permanent land areas—brown.
- (e) All other—black.
- (f) Cross-hatching of completed areas searched—color optional but different for each day, or night, but will not be blue, brown, red, or black.

### 642 SAR Mission Overlays

When the search mission continues beyond one day, the SAR mission chart if continued in use will become too cluttered for effective search planning. Therefore transparent overlays of thin plastic or tissue are used on top of the original SAR mission chart. The sequential search efforts such as first-day search, first-night search, second-day search, etc., are plotted on successive overlays. The same mission data and plotting color code is used on the overlays as is used on the SAR mission chart. One advantage of this system is that when the SAR mission chart and overlays are placed on top of an underlit table, the top overlay will show only its information when the table is unlighted, but the entire mission effort with an excellent presentation of the thoroughness of search coverage is presented when the table is lighted by showing all completed cross-hatched search areas. The overlay for the current search effort is scotch-taped on the left border until a new overlay is required; it is then changed to a scotch-taped hinge on the top border on top of all previous overlays. Some SAR Coordinators have established the practice of taking a daily color photograph of each day's or night's search effort as depicted on the overlay. This photograph is then filed with the SAR mission folder.

rather than the large overlays after the mission is concluded. The system with an underlit table is useful only when using charts which are blank on the reverse side.

#### **643 SAR Unit Charts**

SAR unit charts are required for all participating SAR units. They are used for determining access, en route, on scene, and return navigational information, as well as for on scene search operations. On those missions involving a large number of sorties, SRUs, and an assigned SAR Briefing Officer, SAR unit charts of individual search areas should be prepared by the briefing officer and delivered to the SAR unit commander at the time of his briefing. In this case, the SAR unit chart should include not only the boundaries of the assigned search area but also the en route track, return track, and search tracks to be covered while the unit is on scene. This is particularly effective in overwater searches where the SMC may desire to employ en route searching by aircraft and vessels proceeding to and from the scene. Adjacent search areas and details of SRUs in those areas should also be noted on the SRU chart.

#### **650 ADMINISTRATIVE REPORTS**

SAR mission reports, SAR assistance reports, or other written reports of SAR activities are required by senior SAR coordinators and higher authorities. These are administrative in nature and are not incorporated in this manual.

#### **660 SAR CASE STUDIES**

A study of a particular SAR case should be considered by a SAR coordinator any time an improvement in the SAR System may be indicated. Many times an examination of the search effort after the recovery of survivors, and a reconstruction of the actual circumstances of that distress, will provide information for improving SAR techniques and procedures, and for disseminating to other SAR coordinators the experience gained by the participating units. SAR case studies should also be considered whenever a search fails to locate a target which is found after the mission was terminated; a mission is believed to be of unusual interest due to new methods or procedures used, or unusual experience gained; or a mission fails to locate a target with resultant loss of life.

SAR studies are normally brief and concise and deal only with factors that are considered contributory to the purpose of the study, together with any recommendations for improving the SAR System. Areas of special interest include initial error in position of the distressed craft, the drift computations compared with actual drift, search area determination, thoroughness of area coverage, including accumulative probability of detection, type patterns used, use of—or lack of—detection aids, and reasons for failure to locate the target. Comments may also be appropriate as to efficiency or quantity and quality of SRUs. If poor or inadequate communications hampered the search effort, comments should also include the nature of communications difficulty, with any pertinent recommendations for improvement.

## Chapter 7. TABLE OF CONTENTS

	<b>Page</b>
700 General	7-8
701 Incident/Case/Mission/Sortie	7-8
710 Awareness Stage	7-8
711 Initial Awareness	7-8
712 SAR System Awareness	7-8
713 Receiving Information	7-8
714 Recording Information	7-4
715 SAR Incident Data	7-4
716 Weather Information	7-5
720 Initial Action Stage	7-6
721 General	7-6
722 Initial Action Events	7-6
723 SMC Designation	7-6
730 Incident Evaluation	7-6
731 General Considerations	7-6
732 Time Factors	7-6
733 Survival Environment Factors	7-9
734 Survivor Stress Factors	7-14
735 Terrain Factors	7-15
736 Available SRU Factors	7-15
737 Legal Factors	7-15
738 Survival Equipment Factors	7-16
739 Risks vs. Gain Factor	7-16
740 Emergency Phases	7-16
741 Uncertainty Phase (INCERFA)	7-16
742 Alert Phase (ALERFA)	7-16
743 Distress Phase (DETRESFA)	7-16
744 Assigning Emergency Phase Classifications	7-16
745 Terminology in Domestic Airspace	7-17
750 SAR Incidents	7-17
751 Surface Vessel SAR Incident	7-17
752 Aircraft SAR Incident	7-18
753 Incidents Involving Undersea Craft	7-18
754 Miscellaneous Incidents	7-18
760 Initial Action of SAR Facilities	7-19
761 SRU Selection	7-19
770 Communication Search	7-19
771 PRECOM for Marine Craft	7-19
772 EXCOM for Marine Craft	7-20
773 PRECOM for Aircraft	7-21
774 EXCOM for Aircraft	7-21
775 Other Sources of Information	7-22
780 Typical Initial Actions	7-22
781 Actions During the Uncertainty Phase	7-22
782 Actions During the Alert Phase	7-22
783 Actions During the Distress Phase	7-23

## Chapter 7. AWARENESS AND INITIAL ACTION STAGES

### 700 GENERAL

The awareness stage and the initial action stage are the first two stages in which the SAR system operates. Before the SAR system can be activated it must first become aware that an emergency or potential emergency situation exists. The SAR system must then evaluate that information and take various actions throughout some or all of the following stages. This chapter is limited to the operational events which the SMC executes during these first two SAR Stages.

### 701 Incident/Case/Mission/Sortie

A SAR incident is defined as the specific situation or happening that causes the SAR system to be activated. A SAR case is a generic term used to describe all actions taken in response to a SAR incident. It is used primarily as an all-inclusive term for documentation purposes. A SAR mission is defined as the actions taken when facilities are dispatched to relieve the SAR incident. A SAR sortie is defined as a single flight, cruise or trip of an SRU from one departure base to the next arrival base.

### 710 AWARENESS STAGE

The awareness stage is defined as the attaining of initial knowledge of the existence of an actual or potential emergency situation or incident. It includes the receiving of information by any person or agency, who in turn subsequently notifies the SAR system.

### 711 Initial Awareness

An incident normally occurs prior to a distressed person's attempt to communicate his situation. Sometimes the person can anticipate the occurrence of an emergency situation, and is able to communicate prior to the incident. In any case the communication phase must be initiated prior to the SAR system becoming aware

of the situation. This may be accomplished by the person in an emergency situation communicating with a ship, aircraft, or other radio stations; by his situation being observed by nearby personnel; or by others monitoring his craft's progress and becoming alarmed at either a lack of communications or a nonarrival at destination.

### 712 SAR System Awareness

When a person or agency which becomes aware of a possible emergency incident relays this information to an RCC, RSC, SAR unit, or SAR facility, then the SAR system is activated. The information is usually relayed to the appropriate RCC or RSC. If the SAR facility receiving the information is an operational facility, and the situation warrants it, immediate action shall be taken to relieve the incident. The fact should be reported to the responsible RCC or RSC in the initial report.

### 713 Receiving Information

All SAR personnel who are in a position to receive reports of emergencies must be cautioned not to delay action in order to obtain nonessential information. For almost all emergency situations, action can be started as soon as the nature and general position of the emergency is known. Remaining information which might be helpful to the resolution of the mission should be obtained after initial actions have been started. Communications should be maintained with a craft or person reporting an emergency situation and they should be kept advised of the action being taken. They should not be told to standby or wait; rather, they should be reassured that communications contact is being maintained. Shifting of frequencies, which could lead to loss of communications, should be avoided. If a frequency shift is required, firm communication contact should be established on the second frequency before

abandoning the first frequency. When necessary to maintain communications, a suitably equipped aircraft should be dispatched to act as a communications relay.

## 714 Recording Information

Each RCC and RSC shall initiate an incident processing form on each incident reported. The incident processing form should provide a systematic format and check list of all essential data to be obtained and action to be taken. Use of this form does not eliminate the requirement for making opening and closing entries in the SAR operations log. Primary SAR facilities (those which have a primary task of SAR) should maintain an incident processing form identical to the one used by their RCC or RSC to insure rapid relay of incident data.

## 715 SAR Incident Data

The following information, or as much of it as possible, should be obtained from the craft or individual reporting actual or potential emergency situations or incidents.

The items are listed in the order of their importance to the SAR system and all SAR personnel in a position to receive information of emergency incidents should be briefed to obtain the most important information first in case communications should fail during the actual reporting. Such local action as is appropriate should be taken and the nature of the emergency and the position should be immediately relayed to the RCC along with information on action taken.

### a. Air or Marine Craft Incident Data

1. Distressed craft (name or type/call sign).
2. Position of emergency (latitude/longitude or bearing/distance from known point or last reported position and next reporting position).
3. Nature of emergency (fire, collision, man overboard, disabled, overdue, bailout, crash, etc.).
4. Date/time of position.

*Take appropriate action and/or alert RCC or RSC*

5. Are survivors in sight?
6. Was a parachute sighted?

7. Craft description (size, type, hull color, cabin color, deck color, rigging, fuselage color, tail color, wingtip color, etc.).

8. Persons on board (POB).

9. Date, time, and point of departure, planned route, speed of advance (SOA), ETA and point of destination.

10. Radio frequencies in use, monitored, or scheduled.

11. Emergency radio equipment and frequencies, including EPIRB.

12. On scene weather and sea conditions.

13. Assistance desired, if not obvious.

14. Assistance being received, if any.

15. Heading/speed/altitude/fuel.

16. Initial reporter (name/telephone or address if person; name/call sign if craft: ARTCC; OATCC; parent agency).

17. Date/time of initial report.

### *Relay to RCC or RSC*

18. Possible route deviations.

19. Navigation equipment.

20. Survival equipment.

21. Food/water duration.

22. Other information sources (friends, relatives, associates, agents, agency).

23. Auto/boat trailer license, description, location, if pertinent.

24. Other pertinent information.

### *Relay to RCC or RSC*

### b. Medico Incident Data

1. Craft with medico (name or type/call sign or number).

2. Craft's position (latitude/longitude or bearing/distance).

3. Date/time or position.

4. Craft's course/speed.

5. Patient name, nationality, age, sex, race.

6. Patient symptoms.

7. Medication given.

8. Standard medicine chest or other medication available.

9. Radio frequencies in use, monitored, or scheduled.

### *Relay to RCC or RSC*

10. Craft description.

11. M/V's local agent.

12. Craft's last port of call, destination, ETA.
13. On scene weather and sea conditions.
14. Assistance desired, if not obvious (CIRM relay or local medical advice).
15. Assistance being received, if any.
16. Initial reporter (parent agency, radio station, name/call sign if craft, name/telephone or address if person).
17. Other pertinent information.

*Relay to RCC or RSC*

**c. Lost Person Incident Data**

1. Name of missing person.
2. Location last seen.
3. Date/time last seen.
4. Known intentions or possible actions of missing person.
5. Description of missing person.
6. Clothing, footgear, and equipment.
7. Physical and mental condition.
8. Knowledge of area.
9. Outdoor experience.
10. Weather conditions.
11. Action being taken.
12. Assistance desired, if not obvious.
13. Initial reporter (name/telephone or address).
14. Date/time of initial report.
15. Nearest relative (name/telephone or address).
16. Other pertinent information.

*Relay to RCC or RSC*

**d. Man Overboard Incident Data**

1. Craft with man overboard (name or type/call sign or number).
2. Craft's present position (latitude/longitude or bearing/distance from known point).
3. Date/time of present position.
4. Craft's course/speed and destination.
5. Craft's position when man went overboard (latitude/longitude or bearing/distance from known point).
6. Date/time of man overboard position.

*Take appropriate action and/or relay to RCC or RSC*

7. Water temperature.
8. Person's name, age, sex.

9. Person's physical condition and swimming capability.

10. Person's clothing amount and color.
11. Person's lifejacket, if any.
12. Has craft made search?
13. Will craft remain and search and if so, for how long?
14. Radio frequencies in use, monitored, or scheduled.
15. On scene weather and sea conditions.
16. Assistance desired, if not obvious.
17. Assistance being received, if any.
18. Initial reporter (parent agency, radio station, name/call sign in craft.).
19. Other pertinent information.

*Relay to RCC or RSC*

**716 Weather Information**

When the SAR system is made aware of an incident, the individual reporting it should be interrogated in detail on the existing weather conditions any time the position of a distress is in doubt. Even though the information obtained may not be completely accurate it will give an indication of the weather that was encountered by the distressed craft, and that will be encountered by search craft dispatched to the scene. This can be of considerable assistance when dealing with missions in remote areas where weather stations are widely separated. Specifically the individual should be interrogated on the following details:

- a. The state of the sky, clear or cloudy, and recent changes.
- b. Whether clouds are low or high.
- c. Whether rain or snow is falling or has fallen, and time of beginning and ending of fall.
- d. Whether severe weather such as thunderstorms, hail, ice pellets, or freezing rain are occurring or have occurred, and at what times it began or ended.
- e. Visibility and any obscurations such as fog, smoke haze, etc., and the time of any recent changes.
- f. The state of the water or snow surface, if applicable.
- g. Wind direction and velocity, and recent changes.

## **720 INITIAL ACTION STAGE**

### **721 General**

The initial action stage is the second stage of the SAR system. It is the stage during which the system commences its response to an incident. Once the SAR system has been notified on the existence of an incident, the complete resources of the system may be used to resolve that incident.

### **722 Initial Action Events**

There are five operational events which may occur within the initial action stage:

- a. Incident evaluation,
- b. Emergency phase classification,
- c. SAR facilities alerted,
- d. Preliminary communication search, and
- e. Extended communication search.

### **723 SMC Designation**

The RCC may designate an SMC shortly after the awareness stage is completed. If a designation is not made, then SMC responsibilities automatically devolve upon the RCC controller as representative of the SAR coordinator. The RCC may also designate an SMC at some later stage of the operation if circumstances dictate that this action is necessary for better coordination of the mission. Under no circumstances should the lack of a specific SMC designation stop or delay the response of any individual, unit, or facility from responding to an incident of which they become aware and for which they can render assistance.

## **730 INCIDENT EVALUATION**

### **731 General Considerations**

Evaluating incidents to determine the urgency and the extent of required SAR system response, or the termination of its response, is a function requiring information, judgment, and experience. In emergency situations requiring immediate assistance, the action taken must be accomplished quickly and instinctively. Where uncertainty exists, evaluation is usually more difficult and time consuming because of the many variable factors involved.

Perhaps the most difficult task the SMC undertakes is the evaluation of these factors. They

usually become apparent between the time the incident is reported and the execution of the search, a time when speed and reliability may be most important, but also a time when incident reports may be incomplete or confused. The most serious limitation is time itself. When persons are injured or are subjected to adverse weather, climatic, or water conditions, the chances for survival decrease rapidly. Time limitation also may be dictated by the number of hours left for a daylight search, although the SMC should not arbitrarily rule out night search.

The facilities available to carry out a search are also influential. A lack of SAR facilities can be caused by crew mission time expiration, aircraft or vessel maintenance, or SAR facilities involvement in another mission. The SMC must be constantly aware of the current status of all facilities available to him.

Terrain, weather, and oceanographic conditions can affect all areas in SAR planning and operations. Search visibility, aircraft limitations, search effectiveness, safety of flight, time available to complete the search, are just a few of the areas affected by these factors. Legal factors may be also have to be considered.

Whenever practicable, pertinent data should be plotted on a chart to aid in evaluating related factors.

Normally the RCC controller or SMC determines the urgency and extent of SAR services required for an incident. A rapid but systematic approach is essential since prompt response to emergency incidents is the essence of the SAR system.

### **732 Time Factors**

#### **a. General Time Factor**

The probability of finding survivors and their chances of survival diminish with each minute after an incident occurs. All SAR activities shall therefore take prompt and positive action so that no life will be lost or jeopardized through wasted or misdirected effort. Records have indicated that the life expectancy of injured survivors decreases as much as 80 percent the first 24 hours following an accident, while the chances of survival of uninjured survivors rapidly diminishes after the first 3 days. These figures are averaged from overall experience.

In a wartime environment overland, these figures are drastically reduced due to the greatly increased stress upon the survivors and difficulty of providing SAR services on the scene within a few minutes following a distress incident. Individual incidents will vary with local conditions such as terrain, climatic conditions, ability and endurance of survivors, emergency survival equipment available to the survivors, and SAR units available to the SAR system. Figure 7-1 depicts the results of a study conducted by the USAF Arctic Desert Tropic Information Center (ADTIC) of over 600 SAR incidents. This figure graphically demonstrates the need for prompt response of the SAR system for the saving of life. In general, both time and survival environment factors tend to force the SMC to use more SRUs at earlier times during urgent missions.

#### b. Specific Time Factors

In the case of seriously injured survivors or survivors in a hostile environment such as frigid waters, war zone, etc., the reaction time of the SAR system must be measured in minutes.

Records show that critically injured survivors of any accident usually die within the first 24 hours if not given emergency medical care.

#### c. Weather/Oceanographic Factors

Adverse weather prevailing in or approaching an area where survivors are located may also limit the time available to conduct a SAR mission. Not only are survivors of a distressed craft more difficult to detect under adverse weather conditions, but the SAR units themselves operate at much less efficiency due to the added turbulence, rough seas and higher stresses on both the search personnel and their craft. Accur-

Survivor Recovery Time

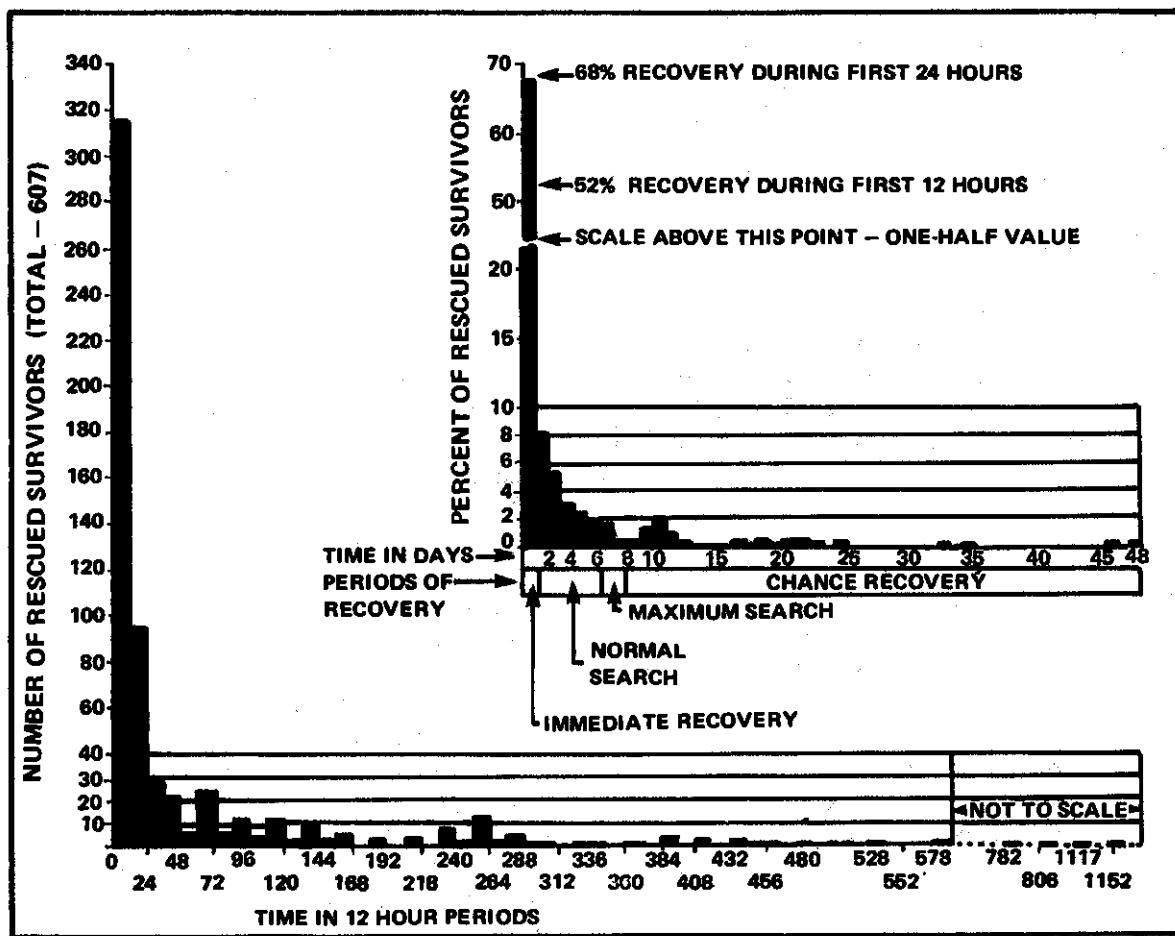


FIGURE 7-1

rate knowledge of weather conditions and prudent judgment based on it will enhance the likelihood of a successful mission. Knowledge of the prevailing weather conditions will also play an important role in the safety of the search units.

If current weather will not allow a search without endangering additional lives, the search effort should normally be delayed. If weather is currently good but forecast to deteriorate in a short time, more rapid action is required and detailed planning may suffer due to the time available. If weather is good and forecast to remain so, more extensive planning may be accomplished.

Wind, visibility, and cloud cover influence the search track spacing. Therefore, the better the weather information, the more realistic will be the derived track spacing. Maintaining accurate search patterns is difficult in adverse weather. Aerial units are particularly vulnerable. For this reason the SMC or OSC should select patterns that allow for more precise navigational accuracy. Loran, TACAN, and VOR oriented patterns are particularly useful in this situation.

Safety as affected by the weather conditions should be of the utmost concern to the SMC. Low ceilings and restricted visibility are particularly hazardous when many aerial search units are involved. If the search is to be conducted in an area where few navigational aids exist and poor visibility conditions prevail, the SMC may have to suspend search operations since aircraft will have difficulty in maintaining separation among themselves. (The OSC should also understand his prerogative in such situations to suspend the search if he considers it prudent to do so.)

In addition, survivors may be adrift in areas where high velocity water currents are present. In this situation the best chances of locating the survivors are during the early hours after the survivors have gone adrift in order to reduce the possibility of survivors drifting out of the search area.

In missions involving overdue craft, the weather situation should be evaluated to determine what effect it may have had upon the craft's operating capabilities or the actions of the craft's operator.

a. What was the weather at the departure point, destination, and along the planned track

at the time the overdue craft should have been in those areas? If no established weather facilities are available, the information should be obtained from local sources in the areas concerned, if possible.

b. What was the enroute and forecast weather briefing given to the crew of the missing craft, and what was the operator's reaction to the weather briefing?

c. What was the weather in the area where the missing craft is presumed to be? If the time of emergency is known, what was the actual weather conditions at the craft's estimated position?

d. Were there any marked changes in wind or sea currents that might have resulted in navigation errors?

e. Were there any areas of low ceiling, poor visibility, precipitation, thunderstorms, frontal activity, turbulence, icing, that may have caused the craft to attempt circumnavigation, or that exceeded either the craft's or operator's capacity to cope with?

f. Were there any areas of marked pressure changes which may have caused aircraft altimeter errors?

Occasionally missions will occur during which radio contact can be established with survivors who do not know their exact position. If survivors can report sufficient weather information, the SMC and meteorological personnel will be able to develop a good approximation of the survivors' position by fitting the survivors' weather into the current synoptic picture. The following weather information should be requested immediately, and on a scheduled basis thereafter, if possible:

Percent of cloud cover.

Estimated heights of clouds.

Estimated type of clouds.

Surface wind direction and estimated speed.

Winds aloft direction, if discernible by cloud movement, and estimated height of wind shift.

Prevailing weather phenomena such as snow, rain, fog, sea state, etc.

The times of sudden changes in wind or weather such as rapid clearing, quick deterioration of conditions, sudden changes in wind direction, noticeable change in temperature, or any other condition that might indicate frontal passage.

Outside air temperature.

Pressure reading of barometer, or altitude reading of altimeter set for 29.92 inches.

Pressure trends from altimeter or barometer.

#### d. Daylight Factor

For survivors without any type of detection aids, daylight visual search is usually the only search method available to the SMC. If darkness is approaching this would be another limiting factor for the SMC to consider.

#### e. Nighttime Factor

If it is known or suspected that the survivors have detection aids such as pyrotechnic flares or other night signaling devices or can display other lights, night searches should always be conducted. Night searches are particularly effective over sparsely populated and flat terrain, such as polar ice caps or deserts. However, if it is definitely known that the survivors have no night visual aids, an aircraft night visual search is futile. An exception is when the use of parachute flares or an aircraft's night illumination system can be employed for search for survivors in a fairly accurately known area. An additional advantage of night searches is that loran coverage will be greater and celestial navigation is often possible.

Night aural and visual search with surface

craft however, is effective when the survivors have no detection aids. Usually both a visual and an aural search can be combined by the surface SRU.

### 733 Survival Environment Factors

#### a. General

The environment in which the survivor is exposed is another factor which limits the time available to complete his rescue. In some cases, environment will be the most time critical of all. Climatic atlases are useful to evaluate probable climatic conditions in regions where few or no weather reporting facilities are available. The relation of survival time to water temperature, air temperature, humidity, and wind velocity is not a simple one. These and other factors often exist in combination to complicate the problem of estimating life expectancy of survivors. Each individual will vary in his reaction to cold and heat stresses. Additional factors which will vary a survivor's life expectancy include the type of clothing worn, the clothing's wetness, the survivors activity during his exposure, his initial body temperature, his physical condition, thirst, exhaustion from lack of sleep, hunger from lack of food, various psychological stresses such as isolation, loneliness, and

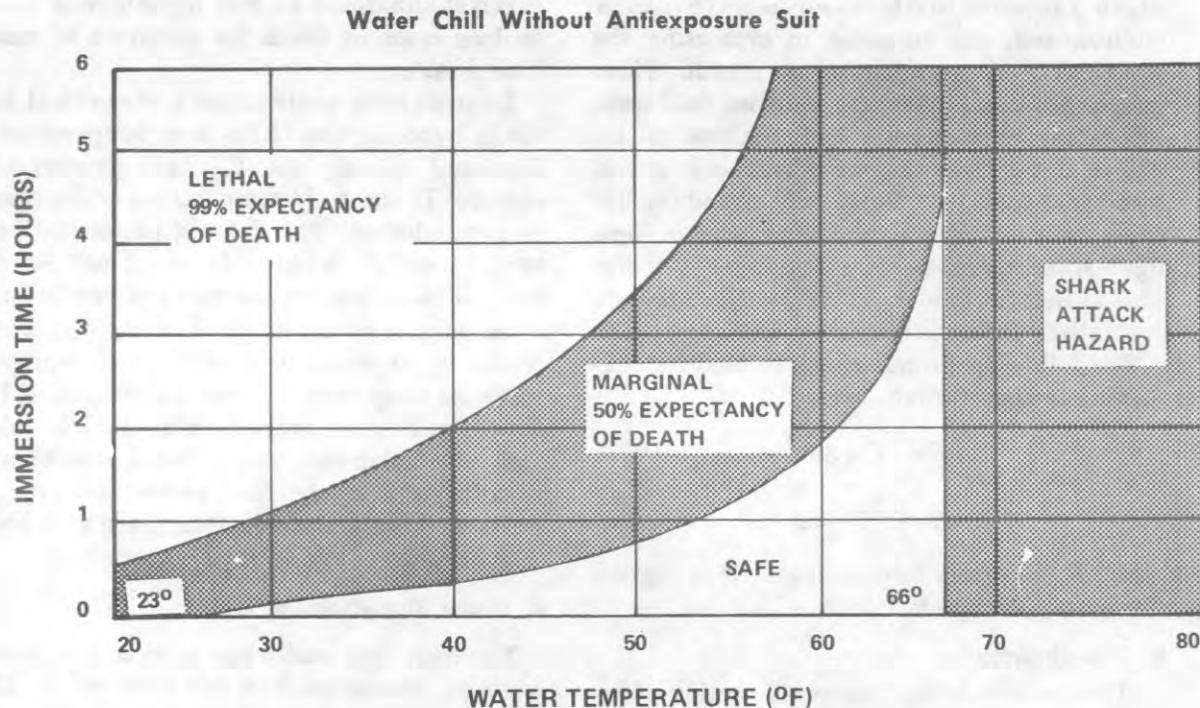


FIGURE 7-2

### Water Chill With Antiexposure Suit

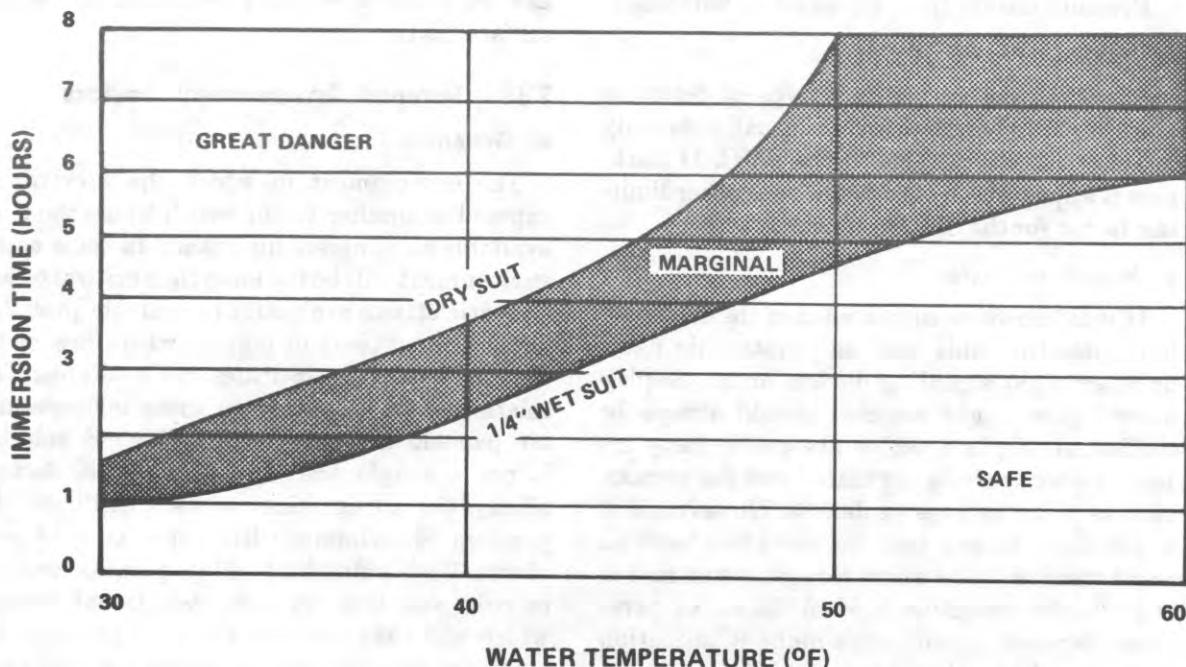


FIGURE 7-3

remoteness, and the all-important individual will-to-live.

The graphs of figures 7-2 through 7-7 are provided to assist the SMC in determining the urgency required to remove survivors from their environment, and to assist in evaluating the practicality of terminating a search. These graphs are based upon case histories, field tests, laboratory experiments, and analysis of all known data. However, the SMC must understand that some individuals will exceed the life expectancy or tolerance times indicated in these figures, and therefore should consider these figures as helpful guidelines rather than absolute controlling factors.

The following formulas may be used for converting temperature scales:

$$F = \frac{9}{5}C + 32$$

$$C = \frac{5}{9}(F - 32)$$

where F is degrees Fahrenheit and C is degrees Celsius or Centigrade.

#### b. Hypothermia

Hypothermia is the abnormal lowering of internal body temperature (heat loss) and results from exposure to the chilling effects of cold air,

wind or water. Death from hypothermia may occur during either land survival or water survival situations, although one study indicated that it occurs over 4 times more often in water survival situations. In fact hypothermia is the leading cause of death for survivors of maritime disasters.

Internal body temperature is the critical factor in hypothermia. If the body temperature is depressed to only 95° F., most persons will survive. If the body temperature is depressed to approximately 91° F., most persons will return to useful activity. At about 90° F., the level of consciousness becomes clouded and unconsciousness occurs at 86° F. Only 50 percent would be expected to survive these temperatures. At body temperatures depressions of 79° F. and below, the average individual will die, and ventricular fibrillation (heart attack) will usually occur as the final event. However in some cases individuals have survived with body temperatures as low as 64° F.

#### c. Water Hypothermia

The body will cool when immersed in water having a temperature of less than 92° F. The warmest ocean water that can be expected at any time of year is 84° F. Approximately one

third of the earth's oceans have water temperatures of 66° F. or above. The Defense Mapping Agency publication, HO-255, "Atlas of Sea Surface Temperatures," can be used to determine water temperatures for the Pacific, Atlantic, and Indian Oceans for any month of the year.

The rate of body heat loss increases as the temperatures of air and water decreases. If a survivor is immersed in water, hypothermia will occur very rapidly due to the decreased insulating quality of wet clothing and the fact that water will displace the layer of still air that normally surrounds the body. Water allows a rate of heat exchange approximately 25 times greater than that of air at the same temperature.

In water temperatures above 70° F., survival time depends solely upon the fatigue factor of the individual, some individuals having survived in excess of 80 hours at these temperatures. Staying afloat and fighting off sharks are the major problems at these temperatures. Between 60° and 70° F. an individual can survive up to 12 hours. At 60° F., skin temperatures will decrease to near water temperature within 10 minutes of entry and shivering and discomfort is experienced immediately upon immersion. Dunking and submersion difficulties become increasingly distressful to the survivor. From 50° to 60° F., a survivor has a reasonably good chance if rescue is completed within 6 hours. Faintness and disorientation occur at water temperatures of 50° F. and below. Violent shivering and muscle cramps will be present almost from the time of entering the water and intense pain will be experienced in the hands and feet. This very painful experience will continue until numbness sets in. All skin temperatures decrease to near the water temperature in about 10 minutes. In the temperature range from 40° to 50° F., only about 50 percent of a group can be expected to survive longer than 1 hour. Water temperatures between 35° to 40° F. also impose severe conditions for survival, and most survivors will not survive longer than 1 hour. In water temperatures of 35° F. and below the survivor suffers a severe shock and intense pain on entering the water. This shock in some instances may be fatal owing to loss of consciousness and subsequent drowning.

Water survivors who die within 10 to 15 minutes after entry into frigid water apparently do not succumb because of reduced body temperature, but rather from the shock of rapid entry into cold water. Fifteen minutes is too short a time for the internal body temperature to fall to a fatal level, even though the outer skin temperatures are at the same temperature as the water. In addition, the temperatures of the hands and feet fall so rapidly that such immersions are frequently less painful than those in 40° to 50° F. water.

Figure 7-2, *Water Chill Without Antieposure Suit*, depicts the life expectancy of survivors immersed in water wearing typical clothing. The survival times indicated in figure 7-2 are for uninjured survivors; injured survivors will die in less time. This graph is a guide for estimating life expectancy, but it should be realized that there will be exceptions. For example a female will generally survive longer than a male due to the fatty tissue layer underlying her skin which acts as an insulator. Also fat people will tend to survive longer than thin people, and those in good physical condition will survive longer than those in poor physical condition. In addition the graph is based on data for white-skinned persons. Those with yellow skin may be expected to survive longer than the graph indicates, while those with black skin can be expected to survive less than the times indicated. The spread of time indicated in the marginal portion of the graph is the period in which survivors will usually lose consciousness and then drown.

Figure 7-3, *Water Chill With Antieposure Suit*, depicts the tolerance time of survivors immersed in water while wearing either a one-fourth inch foamed neoprene wet suit or a survival dry suit. Survivors wearing wet suits will lose body heat only three times as quickly in water when compared to heat loss in air of the same temperature. (This is about one-eighth the rate of loss if only regular clothing were worn by the survivor.) Figure 7-3 will provide the SMC with the expected times that survivors will become either unconscious or will be experiencing such severe leg cramps, stomach cramps, or pain in the hands and feet that continued endurance is reduced drastically. Although the dry suit curve indicates a longer tolerance time, these suits leak appreciably and

their effectiveness is decreased. Therefore dry suit effectiveness would more likely be near the wet suit curve in actual practice. In addition some experiments have shown that anti-exposure dry suits have only afforded one half the protection of wet suits combined with thermo boots.

#### d. Evaporation Hypothermia

It is logical to expect that if a survivor could be removed from the water, his life expectancy would increase even though he may be exposed to the cooling effects of water evaporating on his skin. Figure 7-4, *Evaporation Chill With Wet Antiexposure Suit*, depicts the tolerance times for survivors when initially immersed in 32° F. water for 5 minutes and then boarding a raft in calm wind conditions. As would be expected the antiexposure dry suit type affords better protection under these circumstances than the one-fourth inch foamed neoprene wet suit. This chart may be used as a guide in estimating the probable time of onset of unconsciousness under these circumstances.

#### e. Wind Hypothermia

Although the body will lose heat approximately 25 times slower in calm air than when immersed in water, the body heat loss will be accelerated with increasing wind velocities. In mountainous, polar, winter, and maritime inci-

dents this is an additional factor to consider for exposed survivors. Figure 7-5, *Equivalent Temperature Curves*, depicts the effects of various wind speeds and air temperature combinations, with the curves indicating the equivalent temperature as felt in a person's dry skin.

For example suppose a 7-knot wind was blowing, and the survivor were walking into the wind at 3 knots. In effect he has 10 knots of wind blowing past him. If the air temperature is only -10° F., his skin will be feeling the equivalent temperature of -35° F. and his body heat loss would be equivalent to that loss at -35° F. with no wind.

These curves emphasize the necessity for shelter for survivors when exposed to severe cold conditions. Dry human flesh freezes when exposed to atmospheric cooling values of between 1,300 and 1,500 calories per square meter per hour. At about an equivalent temperature of -25° F. exposed flesh will freeze within 60 seconds; while at an equivalent temperature of about -70° F. exposed flesh will freeze within 30 seconds. However, exposed flesh will not freeze, no matter how high the wind velocity, at temperatures above freezing. In addition to the problem of freezing flesh at these temperatures, fatigue, clothing, and shelter also become major factors. For example in the bitterly cold equivalent temperatures below -10° F.,

**Evaporation Chill With Wet Antiexposure Suit**

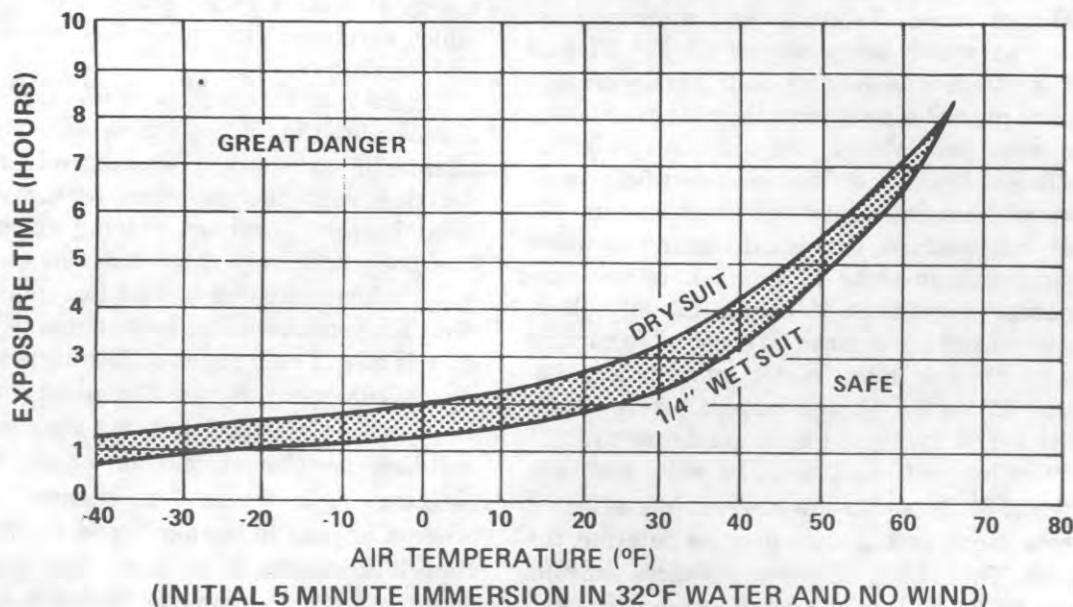


FIGURE 7-4

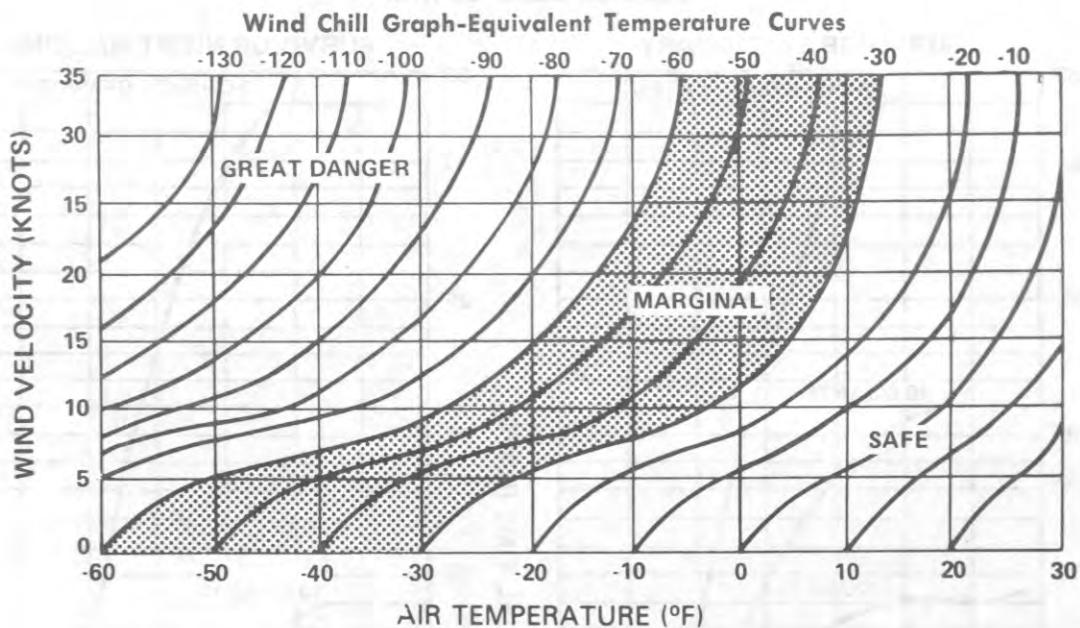


FIGURE 7-5

heavy outer clothing is necessary and both working and traveling alone become increasingly hazardous. At equivalent temperatures below  $-40^{\circ}$  F., heavy clothing and shelter are mandatory for protection, and working or traveling alone is not advisable. In temperatures below  $0^{\circ}$  F. survivors will become easily fatigued and a buddy system of observation of each other is considered necessary for survival.

The wind chill graph, figure 7-5, is based upon studies conducted by the National Science Foundation in Antarctica and is considered to be of greater accuracy than previous wind chill graphs. Wind speeds of over 30 knots will have only a small additional effect for decreasing the equivalent temperatures.

#### f. Heat Stress and Dehydration

Heat stress and dehydration are dangers in hot climates particularly in desert areas. The most severe form of heat stress is heat stroke during which the body temperature rises due to the collapse of the temperature control mechanism of the body. If the body temperature rises above  $107^{\circ}$  F., the average person will die. Milder forms of heat stress are heat cramps and heat exhaustion. Another limiting factor both in hot climates and in survival situations at sea is dehydration. A person totally without water can die in a few days although some have survived for as long as a week or more.

A combination of high temperatures and lack of water can aggravate the problem of heat stress and lead to dehydration quicker than moderate temperatures and lack of water. The life expectancy of survivors in a desert environment is depicted in figure 7-6 for stationary, nonwalking survivors, and in figure 7-7 for survivors who walk only at night. Note that survival time is not appreciably increased until the available water is over 4 quarts. Use of shade or the saving of a few degrees of temperature is as effective and as important in increasing survival time as water.

In jungle areas, the water needs of the body are about one-half to one-third that required in the desert at equal temperatures.

#### g. Animal Life Hazards

The presence of certain forms of animal life may increase the hazard to survivors and reduce the expected survival time within which rescue can be effected.

The greatest danger in the water is that of shark attack. Most shark attacks occur in water of temperatures above  $66^{\circ}$  F. although sharks may be found in almost all oceanic areas and some rivers and estuaries. While the behavior of sharks on any specific occasion is unpredictable, their presence must be considered a major danger to survivors. Some danger also exists for survivors in the water from other predators,

### Expected Desert Survival

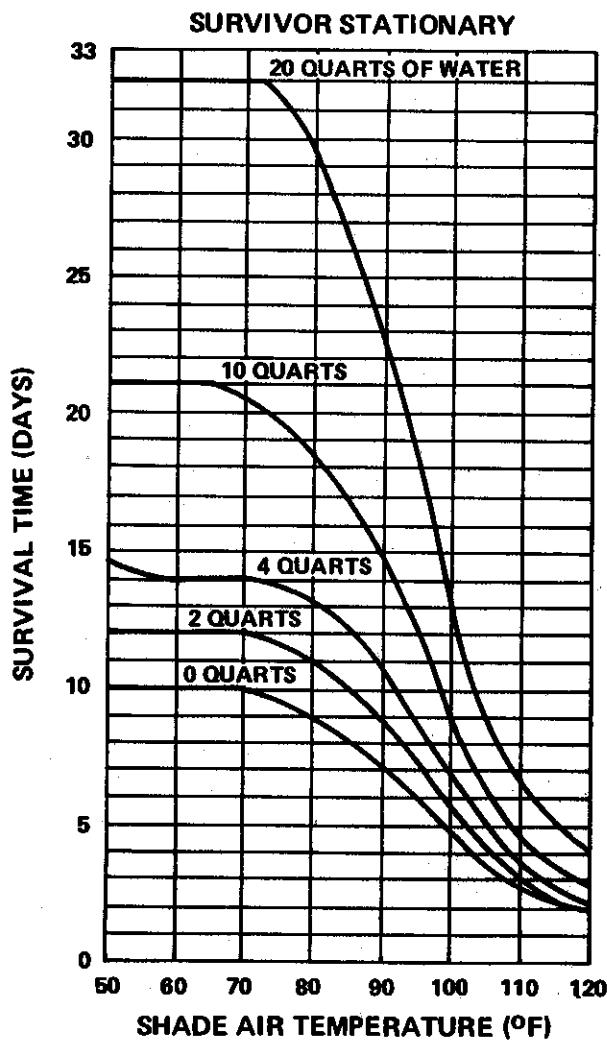


FIGURE 7-6

and from poisonous forms of life such as the Portuguese Man-o-War.

In some land areas, survivors may be endangered by predatory animals, poisonous snakes, and insects.

#### 734 Survivor Stress Factors

Two basic assumptions are always made concerning survivors of a distress incident:

1. There are always survivors who require emergency medical care.
2. The survivors are under conditions of great stress and experiencing shock.

Records show that 60 percent of all survivors of any type accident are injured to some extent. It must also be assumed that there is not even one able-bodied, logical-thinking survivor that

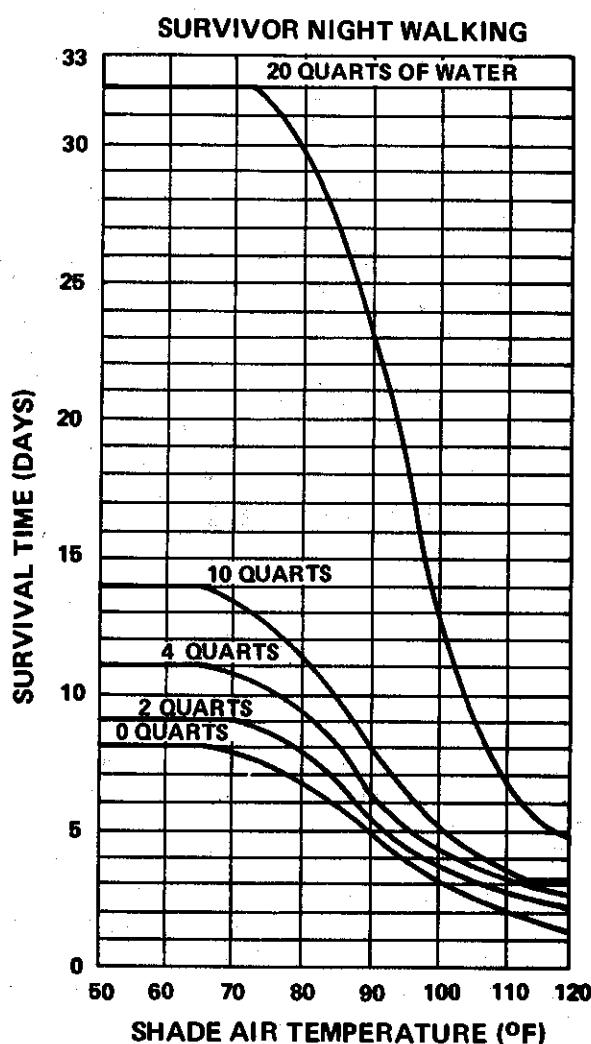


FIGURE 7-7

will be able to help himself. Records include numerous accounts where supposedly able-bodied, logical-thinking survivors failed to accomplish extremely simple tasks in a logical order, and thus hindered, delayed or even prevented their own rescue. The explanation is that the shock following an accident is often so great as to cause those of strong mind to think and act illogically. All survivors will be in some degree of shock. Some may be calm and somewhat rational, some may be hysterical and in strong panic, while the remainder will be temporarily stunned and bewildered. This last group will generally have a passive attitude and can be easily led during the first 24 hours after the incident. As the shock wears off, most of these will develop active attitudes. Those that do not

develop active attitudes will die unless rescued quickly.

Even an individual observing an emergency situation and reporting it to the SAR system should be considered as being under stress. Many times it will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency. This situation should be expected and SAR personnel should be prepared to cope with it. This is one reason for using incident processing forms for recording all initial information.

### 735 Terrain Factors

Terrain may be a major factor in evaluating an incident. It may dictate the type of search pattern required. It may limit the selection of search aircraft which can be used. Aircraft which are highly maneuverable and will be effective at moderately high altitudes may be required in rugged mountain areas. High performance or large transport aircraft may be unusable in confined areas and helicopters may not be able to operate in the thin air and turbulence associated with mountains and contour searches. Terrain may limit the time available for search. For example mountain searches are normally limited to daylight only. The type of survival kit carried by the distressed craft and such things as the type of hoist device used by available helicopters (forest penetrators, etc.) will also be indirect influencing factors. Dense foliage may hamper both visual and electronic searches and require increased numbers of aircraft and closer search track spacing. Man-made additions to the terrain such as power-lines, towers, and bridges must also be considered when planning search altitudes and areas.

Prominent landmarks which can be used as boundaries and checkpoints are best for laying out both air searches overland and ground search areas. Many aircraft have poor navigational aids and many members of ground parties are inexperienced outdoorsmen who will be much more effective when using boundaries readily recognizable to them. The type of rescue team used after the distress site has been located is also dependent upon terrain. Local law enforcement authorities may be used in routine cases but circumstances may force the use of the forest service, mountain rescue clubs, ski clubs, or pararescuemen. When there is doubt about

survivors, the area is inaccessible, time is a factor, and other help is not readily available, air-drop of pararescuemen may be required. Before deploying pararescuemen however, the ability to resupply and recover must be considered.

### 736 Available SRU Factors

During the prosecution of any SAR mission, the SMC will have at his disposal forces whose primary mission is SAR and forces whose primary mission is not SAR but who have SAR capabilities. It is of primary importance to the SMC to understand fully the limitations of all facilities available in his area if they are to be effectively used. The number, types, equipage, and experience of available units and crews will influence the evaluation of incidents by limiting the possible courses of action that an SMC may select. Chapter 3 discusses the capabilities, limitations, and selection of SAR units and SAR facilities in detail. In addition there may be instances when all available crews are either committed to other missions or have expended their maximum authorized crew duty time in the case of flight crews.

Some time is usually required for a suitable SRU to arrive on scene, therefore SRU maximum speed for short distances or normal cruising speed for long distances is a factor. The SRU's range will determine both the maximum distance it can proceed from its operating base and its on scene endurance. The SRU's communication capability for working with the SMC, OSC, other SRU's, and the distressed craft is a factor. The SRU's navigation capability will influence the areas to which it can be assigned, since accurate navigation in search areas is essential for effective coverage. The SRU's normally carried detection sensors and SAR equipment that may be required on scene should be considered. And of course, operating limitations of the SRU will override all other SRU factors. This includes such things as turbulence, icing, and instrumentation for aircraft, and sea-keeping qualities for vessels and boats.

### 737 Legal Factors

One or more of the legal factors discussed in chapter 11 may have to be considered in the evaluation of an incident. For instance, if the reported incident involves the territory of another country, early action may have to be taken to implement procedures for entry.

## 738 Survival Equipment Factors

The amount and type of survival and signaling equipment available to the survivor will influence not only the urgency of the SAR system's response, but also the methods and procedures employed in various SAR stages. For example if survivors have an EPIRB, an immediate, high-altitude electronic search should be conducted. The SMC must use his common-sense, good judgment, and background experience to evaluate the appropriate response for taking advantage of the survivors capability to signal and to survive.

## 739 Risks vs. Gain Factor

SAR facilities are responsible for taking whatever action they can to save life at any time and place where their facilities are available and can be effectively used. Nevertheless, there is a limit beyond which SAR services are not expected and cannot be justified. Known and inherent risk must be carefully weighed against the mission's chances for success and the gains to be realized. SAR personnel and equipment should not be jeopardized, nor the mission attempted, unless lives are known to be at stake and the chances for saving lives are within the capability of the personnel and equipment available.

All reasonable action shall be taken to locate distressed personnel, determine their status, and effect their rescue. Prolonged SAR operations after all probability of survival has been exhausted are uneconomical and not warranted. The decision to conduct such operations must be based on the probability of finding survivors.

Studies have shown that the period within 12 to 24 hours of a distress incident is the most critical for recovery of survivors. The best chance of successful recovery occurs during this time period. Within 48 hours, chance are still good but after that time, the chance of successful recovery decreases rapidly.

## 740 EMERGENCY PHASES

There are three possible emergency phases into which most SAR incidents and subsequent SAR missions are classified. These emergency phases are, in order of progression:

Uncertainty phase—(code word INCER FA).

Alert phase—(code word ALERFA).

Distress phase—(code word DETRES FA).

These phases are used to indicate the seriousness of the SAR incident and for generally determining the action to be taken at any stage of the mission. The code words are used in international civil aviation communications. Upon initial notification of a SAR incident, it is immediately classified into any one of these three emergency phases. As the incident progresses, the emergency phase may be changed depending upon how the situation develops.

## 741 Uncertainty Phase

The uncertainty phase is assigned anytime doubt exists as to the safety of a craft or person because of knowledge of possible difficulties, or because of lack of information concerning progress or position. The key word is *doubt*.

## 742 Alert Phase

The alert phase is assigned anytime apprehension exists for the safety of a craft or person because of definite information that serious difficulty exists which does not amount to a distress, or because of a continued lack of information concerning progress or position. The key word is *apprehension*.

## 743 Distress Phase

The distress phase is assigned anytime immediate assistance is required by a craft or person because of being threatened by grave and imminent danger, or because of continued lack of information concerning progress or position. The key words are *grave danger* and *immediate assistance*.

## 744 Assigning Emergency Phase Classifications

An incident may be classified in one of the emergency phases by:

(a) The pilot of an aircraft or the master/operator of a surface craft.

(b) An aeronautical facility providing air traffic control service and/or flight following service (air route traffic control center or flight service station).

(c) A SAR facility initiating SAR action.

(d) A rescue coordination center.

When initial information is received by an RCC, the incident may already have been classified by either (a), (b), or (c) above. In some cases however, it will be necessary for the RCC controller to classify the incident. For instance, an aircraft or surface craft may report difficulties without any indication of whether the pilot or master/operator considers it a distress or not. Information thus received in an RCC makes it necessary for the RCC controller to assign an emergency phase classification for SAR purposes. Also the RCC controller should not hesitate to upgrade a classification received from another source when, in his judgement and experience, the situation is more serious than the assigned emergency phase classification indicates. Examples of such situations are: A surface craft sends information by an urgency message that it is taking on water but, since the operator believes he can reach port, he has not declared a distress; the RCC controller has reason to doubt that the craft can reach port (possibly bad weather is on the way) so he classifies the incident in the distress phase rather than the alert phase and acts accordingly; or an air traffic controller declares an alert phase on an aircraft which has lost an engine; the RCC controller realizes from experience with similar type aircraft in similar situations that there is a strong possibility that the aircraft will be unable to reach a safe airport so he reclassifies the incident to the distress phase and acts accordingly.

The authority of an RCC controller to reclassify emergency phases does not extend to downgrading a classification received except in cases where the classification was assigned by a subordinate SAR facility in the chain of command.

#### **745 Terminology in Domestic Airspace**

The FAA uses terminology within domestic U.S. airspace to describe emergency phases somewhat different from that used for SAR purposes. The specific FAA terms currently being used are "Information Request (INREQ)" and "Alert Notice (ALNOT)." The INREQ corresponds to a declaration of the SAR emergency phase of Uncertainty. An INREQ is a message request for aircraft information, addressed to flight service stations along the aircraft's planned route. INREQs must be an-

swered within 30 minutes. The ALNOT is an alerting message containing all known aircraft data not previously sent addressed to the appropriate RCC and to all aeronautical facilities within 50 miles of the aircraft's planned route and corresponds to the SAR emergency phase of Alert. ALNOTs must be answered within 60 minutes. The INREQ and ALNOT should be treated by SAR personnel in accordance with their corresponding SAR emergency phase classifications.

In oceanic airspace the emergency phase terms are the same as used for SAR purposes.

In coastal areas where both domestic and oceanic airspace are present, it is possible that aircraft emergencies may be reported to the RCC using either terminology. Local liaison by the SAR coordinator with appropriate FAA facilities will help to clarify any confusion caused by the disparity.

### **750 SAR INCIDENTS**

There will be many different types of incidents reported to the SAR system which must be evaluated and resolved. Most of these incidents may be grouped by the type of craft involved, the incident's environment or, in the case of individuals, by the type of difficulty being encountered.

In general a SAR incident is considered imminent or actual when it is apparent that persons are, or may be, in distress or when a request for assistance has been received.

#### **751 Surface Vessel SAR Incident**

A surface marine SAR incident is considered imminent or actual when any of the following conditions exist:

- (a) A surface vessel has requested assistance.
- (b) A surface vessel has transmitted a distress signal.
- (c) It is apparent that a surface vessel is in distress.
- (d) A surface vessel is reported to be sinking or to have sunk.
- (e) The crew is reported to have abandoned ship or is about to do so.
- (f) Reports indicate that the operating efficiency of the craft is so impaired that the craft may sink or the crew may be forced to abandon it.

(g) The surface vessel is overdue or unreported. Generally, a surface craft may be considered overdue when it fails to arrive at its destination within 2 to 24 or more hours after its estimated time of arrival (ETA). Good judgment is necessary in evaluating the circumstances of particular cases. While a powered vessel, known to be on schedule, should arrive within 2 hours of its ETA, a sailing yacht without communications, which has encountered unexpected head winds, might well be 24 or more hours behind its ETA as given on departure. Yachts which are on long voyages may be days behind schedule. In arriving at a specific figure, circumstances to be considered include: type of craft, experience of operator, habits of operator, weather and sea conditions, etc. A surface craft may also be considered to be overdue when a scheduled position report is 4 hours late and no communications contact can be established.

## 752 Aircraft SAR Incident

An aircraft SAR incident is considered imminent or actual when any of the following conditions exist:

- (a) An aircraft has requested assistance.
- (b) An aircraft has transmitted a distress signal.
- (c) It is apparent that an aircraft is in distress.
- (d) An aircraft is reported to have ditched, crashed, made a forced landing, or is about to do so.
- (e) The crew is reported to have abandoned the aircraft or is about to do so.
- (f) Reports indicate that the operating efficiency of the aircraft is so impaired that forced landing or abandonment may be necessary.
- (g) The aircraft is overdue. An aircraft, on an IFR flight plan, is considered overdue when neither communications nor radar contact can be established with it and 30 minutes have passed after its estimated time over a specified or compulsory reporting point or at clearance limit. An aircraft, on a VFR flight plan, is considered overdue when communications cannot be established with it and it fails to arrive 30 minutes (15 minutes if a jet) after its estimated time of arrival. An aircraft, not on a flight plan, is considered overdue if a reliable source reports it 1 hour overdue at destination. In certain areas of the United States, FAA flight

service stations provide special reporting and flight following service for general aviation type aircraft which follows more stringent criteria. These areas are usually areas where critical survival factors make it desirable for earlier activation of SAR operations in the event of a forced landing. FAA publications should be consulted for the details of these special services and local liaison should be conducted with FAA Regional and Area authorities to insure a smooth interface between the service and the SAR organization.

## 753 Incidents Involving Undersea Craft

### a. Naval Submarines

A naval submarine incident is considered to be imminent or actual under the conditions prescribed in the USN ADDENDUM to this manual. The two phases of emergency for naval submarines are EVENT SUBMISS—the initial search stage and EVENT SUBSUNK—the full scale search. The authority to declare these events is the submarine operating authority. A specialized organization and specialized facilities are provided by the Navy for the purpose of SAR for naval submarines. The relationship of the normal SAR organization to the specialized organization is described in the USN ADDENDUM.

### b. Civilian Submersibles

A civilian submersible incident is considered to be imminent or actual when:

- (a) A submersible fails to surface promptly following a known accident, or when an accident report has been received from any source.
- (b) All contact with a submerged submersible has been lost by a mother ship for 1 hour, unless such lack of contact has been planned.
- (c) There is reason to suspect that a submersible has suffered a casualty and requires assistance.
- (d) A submersible is overdue. A submersible should be considered overdue if it fails to surface within 20 minutes of scheduled surfacing time or if it fails to make a scheduled report, while submerged, within 20 minutes of the scheduled reporting time.

## 754 Miscellaneous Incidents

Although the majority of SAR incidents involve marine craft or aircraft in states of emer-

gency, there are a considerable number of incidents for which the SAR system is activated to preserve life and property which do not fall into these categories. Generally, these will be considered SAR incidents if the SAR organization is used to provide assistance. They may or may not be classified into one of the emergency phases used with marine craft or aircraft. In many cases it is not convenient to so classify them but rather to take such action as is necessary by the inherent urgency of the situation.

## **760 INITIAL ACTION OF SAR FACILITIES**

After the initial report of an incident is received, evaluated, and assigned an emergency phase, there are three possible actions the SMC may take:

(a) Dispatch SAR units immediately, and/or request other facilities to take immediate responsive action (e.g., DF net obtain fix).

(b) Alert SAR facilities to a possible mission, but not dispatch SRU's immediately.

(c) Neither dispatch nor alert other SAR facilities, but conduct further investigation and evaluation to either confirm validity of the reported incident or determine the need for SAR system support.

Generally, if an incident is classified as an Alert, SRUs may or may not be dispatched; if classified as an Uncertainty, SRUs are not usually dispatched.

## **761 SRU Selection**

The selection of appropriate SRUs to dispatch in response to an incident is determined by the various factors discussed in paragraphs 810 through 817, and their availability to the SMC. Ordinarily, primary SAR units should be dispatched first.

## **770 COMMUNICATION SEARCH**

A communication search is conducted by the SMC for any incident in which information in addition to the initial report information is required or desired. This is most common in situations where the distressed, overdue or unreported craft's or person's position is unknown or indefinite. It is the time when detective work is required of the SMC. A communication search may be conducted prior, during, or after dispatching SRUs depending upon the urgency of

the incident. Communication searches involve not only extensive use of communications to uncover and track down leads, but also may involve SRU movement to physically check areas where the craft may be. Generally the purposes of communication searches are to continue efforts to contact the craft, to determine if the craft is overdue or simply unreported, to better localize the search area, and to get more factual data for evaluation of subsequent SAR action. There are two types of communication searches which are usually conducted sequentially: The preliminary communication search (PRECOM), and the extended communication search (EXCOM). PRECOM consists of contacting and checking major facilities within the areas where the craft might be or might have been seen, and is normally conducted during the uncertainty phase. This search should have a reasonably effective probability of locating the missing craft within a short period of time, if the craft is merely unreported rather than actually missing. An EXCOM is normally conducted after a PRECOM has yielded no results, and consists of contacting all possible sources of information on the missing craft, including physically checking possible locations, such as harbors, marinas, and airport ramps. An EXCOM is normally conducted when the mission is upgraded to the alert phase.

## **771 PRECOM for Marine Craft**

A PRECOM for marine craft may include the following:

(a) All USCG facilities in the affected area check radio logs and records for any information.

(b) Inquiries should be made to facilities in locations that will give a reasonably thorough and rapid coverage of the area:

Bridge and lock tenders.

Harbor patrols.

Marinas, yacht clubs, and other waterside facilities.

Dockmasters of major docks.

Harbormasters.

Local police (for boat launching ramps).

(c) Coast Guard auxiliary forces may be used in areas where there are no regular Coast Guard units.

(d) If the missing craft is known to have a radio aboard, contact should be attempted by

Coast Guard stations every 30 minutes for at least a 4-hour period. Marine operators in areas being searched should be contacted and asked to check their logs for the day to determine if they have handled any traffic to or from the craft. Public correspondence marine operators (MAROP) should be asked to attempt one contact.

(e) If the departure point of the craft is in the area being searched, the actual departure and time should be confirmed. If the destination is also in the area, the craft's nonarrival should be verified and request made that the nearest Coast Guard unit be notified immediately if it does arrive. That this has or has not been done should be specifically stated in the SITREP reporting the PRECOM results to the SMC.

(f) Each facility need be contacted only once during the PRECOM.

(g) A report by SITREP to the SMC should be sent when PRECOM is completed. When a facility reports "PRECOM COMPLETED" it is assumed, unless otherwise stated in the message that:

1. All facilities listed on the current PRECOM list have been contacted and checked.

2. All manned Coast Guard units in the area have been notified.

3. If missing craft is radio-equipped, a USCG radio facility has attempted radio contact every 30 minutes and will continue for a full 4-hour period.

4. Marine operator in the area has been notified and attempted one radio contact.

5. A check of unit radio logs and records has been made.

(h) When a vessel is overdue from a long sea voyage, SAR authorities in other countries may be requested to assist through their RCCs or through <sup>U.S.</sup> naval or other military channels. U.S. Embassy or consular officials may also be contacted directly for assistance. In the latter case the U.S. Department of State should be made an information addressee on all messages.

## 772 EXCOM for Marine Craft

An EXCOM for marine craft may include the following items:

(a) As a general rule, facilities checked during PRECOM should be rechecked every 24 hours.

(b) Additional facilities to be contacted during an EXCOM usually are left to the discretion of the command conducting the EXCOM. However, a listing of these facilities should be filed with the RCC. Extensive coverage is desired, considering the characteristics of the missing craft. An EXCOM should provide a thorough and blanket coverage of the area. Suggested facilities and sources of information are:

Bridge and lock tenders.

Vessel/boat agents.

Local, county, and State police.

Police harbor patrols.

Harbor masters, port authorities.

Marinas, docks, yacht clubs.

Fish companies, fisherman associations.

Park service, forest rangers.

Fuel suppliers.

Ice houses.

Ship chandlers, repair yards.

Customs, immigration (if applicable).

Major tug companies (in large ports and rivers).

Relatives and neighbors.

(c) All facilities and persons contacted during this phase should be asked to maintain a lookout for the craft during the course of their normal operations and to notify the nearest Coast Guard unit if it is sighted. A definite time limit should be set so it will not be necessary to recontact these numerous sources to de-alert them after the vessel or boat has been located. If information is still desired after this period, another EXCOM should be initiated.

(d) Local Coast Guard auxiliary forces should be notified and asked to keep a lookout during their normal cruising.

(e) If the missing craft is radio-equipped, contact should be attempted by stations conducting the EXCOM every 4 hours for 24 hours. If it is known that the vessel has the appropriate frequencies, the marine operator should be asked to call the vessel on the same schedule, and to watch for any pertinent information received from other marine craft.

(f) Local press, radio, and television coverage should be made during this phase for further dissemination of, and solicitation for, information on the missing craft.

(g) Since there are numerous facilities which must be checked during the EXCOM, it is not likely that it will be completed in a matter of

hours, particularly if directed at night or on a weekend, as it may be necessary to wait for normal working hours to contact many sources. A listing must be maintained of the facilities contacted. Those that could not be contacted will have to be rechecked. This will insure a thorough EXCOM.

(h) SAR facilities conducting an EXCOM shall submit a SITREP when significant developments occur and daily not later than 0900 local time. The SITREP should indicate the approximate percentage of EXCOM completed. When a facility reports EXCOM completed, it is assumed unless otherwise stated that:

1. All facilities listed on the current EXCOM check list have been contacted and alerted.
2. Radio contact has been attempted and will be continued until 24 hours have elapsed (if radio equipped).
3. Marine operator was alerted as well as other local SAR forces.
4. Physical checks were made of marinas and local harbors.

(i) It should be borne in mind that an EXCOM is only as good or effective as the people that are making it. Because of this human factor, the SMC should monitor the EXCOM as necessary to insure that an effective one is being conducted.

### **773 PRECOM for Aircraft**

The PRECOM for aircraft is usually initiated and conducted by the agency providing flight following service. In the United States this is the Federal Aviation Administration. The PRECOM is conducted by the responsible air traffic control center for aircraft on instrument flight plans and by the responsible flight service station for aircraft on visual flight plans. When an aircraft which is not on a flight plan is reported overdue, the time between his intended arrival and the report is usually so long that the RCC should initiate an EXCOM immediately, at the same time requesting the appropriate flight following facility to carry out its PRECOM procedures.

A PRECOM for aircraft will usually include the following:

(a) Contact destination and alternate airports to confirm that aircraft has not arrived. (Physical ramp checks should be requested at all airports which are not positive controlled airports when confirming aircraft absences.)

(b) Contact departure airport to confirm that aircraft actually departed, has not returned, correctness of flight plan data, type of weather briefing pilot received before departure, and any pertinent medical and personnel data.

(c) Contact aircraft along or near route to attempt radio contact.

(d) Alert airfields, aeronautical radio stations, aeronautical aids to navigation stations, radar nets and DF nets within areas through which or along trackline which, the aircraft may have flown.

A PRECOM must be completed within ETA + 60 minutes for IFR aircraft and within ETA + 90 minutes for VFR aircraft on flight plans. (No time limit is prescribed for aircraft which have filed no flight plans.)

### **774 EXCOM for Aircraft**

The EXCOM for aircraft is the responsibility of the RCC. Its purpose is to obtain any information concerning an overdue aircraft from sources which could not be covered in the PRECOM and in areas of possible landing beyond that covered in the PRECOM. The RCC should use all means of communication available and obtain assistance as necessary from air traffic control centers and flight service stations. The EXCOM for aircraft is normally initiated upon completion of the PRECOM at which time the incident is progressed to the alert phase. However, an EXCOM should be initiated sooner if the situation dictates.

An EXCOM for aircraft should include the following:

(a) Contact all airfields, aircraft carriers and other ships as appropriate, aeronautical radio stations, operating agency's radio stations, aeronautical aids to navigation stations, radar nets and DF nets within 50 miles of route which were not checked during PRECOM.

(b) Contact other airfields in general area where it reasonably possible that aircraft may have landed.

(c) Request aircraft along or near route to attempt contact and monitor appropriate frequencies for possible distress signals.

(d) Contact all other agencies, facilities, or persons capable of providing additional or verifying information. This may include:

- Law enforcement agencies.
- Civil Air Patrol.
- Forest Service units.

## 775 Other Sources of Information

During the PRECOMs and EXCOMs for surface craft and aircraft, and cases involving missing persons, a number of sources of information other than those already listed can be of great value. The below list is not all inclusive but is designed to help in determining sources of information which may give leads to the actions of the missing craft or persons. RCC controllers should use their experience and good judgment, realizing that in this phase of the case, it is desirable to gather all useful information possible in order to form a hypothesis on which to base further action.

- (a) Relatives.
- (b) Friends.
- (c) Neighbors.
- (d) Employers.
- (e) Club members.
- (f) Departure point witnesses.
- (g) Technical information sources, e.g. Lloyds, London (see 211.j).
- (h) Vessel agents.
- (i) AMVER (see 327).
- (j) FAA U.S. Aircraft Registry, Oklahoma City, OK.
- (k) Airport managers.

## 780 TYPICAL INITIAL ACTIONS

Each SAR mission will have its own particular circumstances of responsibility and required SAR system response. It is not possible to develop detailed, comprehensive procedures that can be applied at all times. However, certain basic procedures can be adopted for each emergency phase. The example in this section uses an overdue aircraft. However, the general sequence of events is similar for other types of craft or persons needing assistance. The basic procedures should be interpreted with a measure of flexibility. Many of the actions which follow may be performed simultaneously, or in a different order, to suit particular circumstances, but they should prove of general application.

## 781 Actions During the Uncertainty Phase

(a) An ATC facility becomes aware of an incident, categorizes it as an Uncertainty and relays initial information to the appropriate RCC. The RCC controller starts to record all pertinent data and completes his preliminary evaluation of flight plan, weather, and communication delays, to determine the urgency and validity of the situation. Fuel exhaustion time is computed. At this point the RCC controller assumes SMC. He may alert primary SAR facilities as the situation dictates.

(b) The PRECOM search is initiated and completed by the ATC agency (by RCC in non-aircraft incidents). RCC monitors PRECOM progress.

(c) Should the PRECOM indicate that the missing aircraft has landed safely, or is otherwise safely accounted for, all agencies will be advised immediately so the case can be closed.

(d) Should the PRECOM be unproductive the Uncertainty phase normally progresses to the Alert phase.

## 782 Actions During the Alert Phase

Immediately upon being notified that an aircraft incident is in the alert phase, the RCC controller shall:

(a) Evaluate available information; ascertain that the PRECOM has been completed; determine what stations have been checked; alert appropriate SAR facilities; and initiate the EXCOM search.

(b) Thoroughly evaluate the flight plan, weather, terrain, possible communication delays, last known position and text of radio calls, operator's qualifications, and the aircraft's reputation for performance under unfavorable conditions. Compute the clock time of fuel exhaustion if not done earlier.

(c) Notify the operating agency of the aircraft. If the degree of apprehension warrants, take the necessary action to dispatch alert facilities on a route search.

(d) Upon completion of the EXCOM, or at time of estimated fuel exhaustion, whichever occurs first, the aircraft is declared "missing" and the incident progressed to the distress phase.

## **783 Actions During the Distress Phase**

(a) Until such time as the responsible SAR coordinator designates another officer of his own service or another agency as SMC, the RCC controller prosecuting the incident to this point shall continue to act as SMC.

(b) Type and number of SAR units to be used is determined. SRU crews are briefed and SRUs dispatched.

(c) Secondary SAR facilities, rescue teams, other personnel, and assisting agencies are alerted, if not already accomplished.

(d) The base of departure is notified that an aircraft which has departed from that base has been declared "missing."

(e) Radio stations and en route aircraft are requested to maintain listening watches on specified frequencies for possible transmissions from the missing aircraft or personnel.

(f) The operating agency of the missing aircraft is kept advised of SAR system response.

(g) The SAR mission is planned and carried out in accordance with the principles in subsequent chapters of this manual.

(h) If the craft in distress is of foreign registry, the state of registry shall be notified through the most appropriate means available. In the case of aircraft, aeronautical communications channels or SAR circuits are usually the most rapid means. In the case of surface craft, notification of the nearest consular authorities of the state of registry of the ship is generally satisfactory. Diplomatic channels can be used if necessary.

(i) If the incident consists of an accident requiring investigative action, the appropriate accident investigation authorities shall be notified.