CHAPTER 6

INTRODUCTION

1. Emergencies can occur in flight at any time and without warning. Therefore it is vital that all aircrew have a full knowledge of distress action, so that their response to any emergency is swift and thorough. This chapter deals with various emergency procedures and outlines the emergency organisation of the RAF.

EMERGENCY PROCEDURES

DEGREES OF EMERGENCY

2. Degrees of emergency are internationally classified as being of two standards:

a. Distress. “The calling station has a very urgent message to transmit concerning the safety of an aircraft, or of persons on board or within sight”.

b. Urgency. “The calling station has a very urgent message to transmit concerning the safety of an aircraft, or of persons on board or within sight”.

EMERGENCY TRANSMISSIONS

3. A transmission to be made in an emergency consists of two parts: the emergency call and the emergency message.

a. Emergency Call. Fig 6-1 sets out the radio telephony (RT) and wireless telegraphy (W/T) versions of the Urgency and Distress calls.

<table>
<thead>
<tr>
<th>Degree of Emergency</th>
<th>Pro-word (R/T)</th>
<th>Pro-Sign (W/T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgency</td>
<td>“Pan, Pan, Pan” Aircraft callsign (once)</td>
<td>“XXX, XXX, XXX” Aircraft callsign (once)</td>
</tr>
<tr>
<td>Distress</td>
<td>“Mayday, Mayday, Mayday” Aircraft callsign (3 times)</td>
<td>“SOS, SOS, SOS” Aircraft callsign (3 times)</td>
</tr>
</tbody>
</table>

Fig 6-1: Urgency and Distress Calls
b. **Emergency Message.** The emergency message should include as much of the following information as time permits:

1. **Position And Time**
2. **Heading And Air Speed**
3. **Altitude**
4. **Type of Aircraft**
5. **Nature of Emergency**
6. **Intentions of Captain**
7. **Endurance Remaining**

Although the information should ideally be given in the order listed, the transmission should not be delayed merely to arrange the details correctly. However, the aircraft’s position is at the top of the list, as it is the most important item of information in most emergencies (it is the first thing the rescue services need to know). A useful mnemonic for the emergency message is **PAT HAS ATNIE**.

**EMERGENCY PROCEDURE AND FIXER SERVICES**

4. If an emergency occurs when the pilot is in contact with an Air Traffic Control agency, he should transmit his emergency call and message on the frequency in use. If he is not in contact with an ATC agency when the emergency occurs he should transmit the emergency call and message on 243.0 MHz, with 121.5 MHz being used as a back-up frequency, or on the HF frequency of 500 KHz.

5. **Use of Secondary Surveillance Radar (SSR).** SSR is also used to indicate an emergency and code 7600 indicates a total radio failure. If an emergency occurs when in contact with an ATC agency, the SSR code already set should remain in use unless advised otherwise by ATC. In all other cases the transponder should be set to code 7700.

6. **Final Transmission.** When ditching, crash landing or abandonment is imminent, the aircraft callsign should be transmitted and, where possible, the transmit control switch should be left in the transmit position. For W/T the key should be clamped in the transmit position. These actions should not take priority over abandonment if life would be endangered by so doing.

7. **UHF Emergency Fixer Service.** Within the United Kingdom FIRs a network of stations provide an emergency fixer service. Emergency transmissions on 243 MHz are picked up by stations within range, and a bearing of the aircraft making the transmission from the station is automatically relayed to the ATCC and then displayed on a screen, giving the controller an instant “fix” on the aircraft. This service is accurate down to 5000 feet for most of the area covered, but the lower limit in the Scottish FIR is 8500 feet. Transmissions from the ATCC to the aircraft are relayed through the forward relay system, thus extending the range of the ATCC communications equipment. The nearest forward relay to the aircraft is selected by the controller.

8. **Cancellation.** Should the emergency cease to exist it is most important that a transmission be made to cancel the original call on the frequencies on which the call was made.
9. **Search and Rescue Satellite Aided Tracking (SARSAT). False Alarms.** SARSAT is an alert and location system detecting transmissions on 406, 243 and 121.5 MHz. It is highly sensitive and virtually any transmission on these frequencies may activate the rescue services. Inadvertent transmissions, particularly on 243 MHz, should be reported immediately to the appropriate ATCC in order to avoid wasting search and rescue effort on false alarms.

**EMERGENCIES INVOLVING ANOTHER AIRCRAFT**

10. An aircraft observing another aircraft or personnel in distress should, if possible, take the following actions:

   a. Keep the aircraft or personnel in sight and switch IFF/SIF to emergency. At sea, if a surface vessel is in sight and can be contacted without losing sight of the distressed personnel, guide it to the position.

   b. If the aircraft in distress is not known to have transmitted a distress message, or if the captain of the aircraft observing the distressed aircraft believes that further help is needed, a message containing all of the relevant information should be transmitted to the controlling ground station on the frequency in use.

   c. The captain should then comply with any special instructions given by the controlling authority or remain in sight of the distressed personnel/aircraft until circumstances compel departure.

11. If a distress call or message is heard the captain or crew of the aircraft should take the following actions:

   a. If possible attempt to take a bearing on the transmission and attempt to plot the position of the sender.

   b. Listen out on the frequency used.

   c. If no acknowledgement of the distress message is heard, call the aircraft in distress and acknowledge receipt.

   d. Listen out for instructions from the ground and transmission from the distressed aircraft and act as necessary.

   e. At the captain’s discretion, proceed to the position mentioned in the distress message while awaiting instructions from the ground station.

**COMMUNICATIONS FAILURE**

12. Pilots losing 2-way communications should set their transponder to Mode 3A code 7600. Flight conditions then generally determine the procedure. In VMC and in visual contact with the ground, the flight should be continued in VMC to land at the nearest suitable airfield. In IMC, or anticipated IMC conditions, if the aircraft can be safely navigated the flight should be continued in accordance with the current flight plan. In all cases when the receiver only is operative, instructions from ATC should be complied with. If, however, the aircraft is in or above cloud and the pilot is unable to navigate safely, he should reset the transponder to code 7700 and he may elect to fly one of the following patterns to alert a ground radar station:
a. If the transmitter only has failed, an equilateral triangle to the right, whilst listening out for instructions. (See Fig 6-2).
b. If both transmitter and receiver have failed an equilateral triangle to the left, whilst waiting for interception by a shepherd aircraft (see Fig 6-3). The aircraft in distress should, if possible, remain clear of cloud, be flown for endurance and should have anti-collision lights on.

Fig 6-3: Transmitter and Receiver Inoperative

13. When an aircraft is observed flying right hand patterns, the ATCC will attempt to contact the aircraft on the emergency frequency. If an aircraft is observed flying left-hand patterns a shepherd aircraft will, if possible, be dispatched to assist it. The shepherd aircraft should position in front and to the left of the aircraft in distress. The shepherd will rock its wings, which should be acknowledged with a wing rock; the shepherd will then start a slow level turn onto course. An attempt should be made to contact the shepherd on 243 MHz.

14. **Speechless Procedure**. If an aircraft is above cloud with an unserviceable microphone, or a radio problem which results in an inability to transmit speech, contact can be established with ATC using the speechless code. When the transmit button is pressed a carrier wave will be transmitted and will be observable on the ATC direction finding equipment. Then, by using the speechless code, it is possible to communicate with ATC as follows:
a. For initial contact, make 4 transmissions as for a Morse “H”, meaning “request homing”.

b. One transmission: “Yes” or acknowledgement.

c. Two transmissions: “No”.

d. Three transmissions: “Say again”.

e. Letter “X” in Morse, -•••-: An additional or greater degree of emergency has arisen.

15. Speechless let-down:

a. The transmit button is pressed 4 times as for Morse “H”. The transmission should be made on the emergency frequency where possible.

b. The receiving station will pass a course to steer and the speechless aircraft acknowledges.

c. The aircraft is homed to overhead and given a controlled descent.

d. During the homing the controller determines the aircraft state by questions requiring “Yes” or “No” answers.

e. During the procedure the completion of an instruction, eg steady on heading or height, is indicated by a two second transmission and also when:

   (1) Overhead turn complete.
   
   (2) steady on inbound heading.
   
   (3) Intermediate approach height.
   
   (4) At decision height or minimum descent height.
   
   (5) Airfield in sight.
EMERGENCY ORGANISATION

ATCC DISTRESS AND DIVERSION CELL

16. An aircraft in distress may make contact with an ATCC or ATCRU by transmitting an emergency message on the frequency in use, by transmitting on the emergency frequency, by a relay transmission from another aircraft or, if a radio failure has occurred, by flying the triangular patterns described in para 12.

17. When the ATCC has identified an aircraft in distress, executive authority for the handling of the emergency is passed to the Emergency Controller in the ATCC Distress and Diversion Cell. The aircraft in emergency will normally be transferred to 243 MHz or 121.5 MHz. If the emergency occurs when the aircraft is not in contact with an ATCC, but transmits a distress call on 243 MHz, the emergency services may be alerted by SARSAT.

SEARCH AND RESCUE SERVICES

18. In the event of a crash landing or abandonment the emergency controller will advise the Rescue Co-ordination Centre (RCC) so that the necessary rescue services can be alerted. The RCC co-ordinates the activities of all search and rescue facilities which may include S and R helicopters, lifeboats, long range maritime patrol aircraft, mountain rescue teams and police and ambulance services. There are two RCCs in the United Kingdom; they are situated within the Maritime Headquarters at Plymouth and Edinburgh.