

# CHAPTER 11

## COMMUNICATING EMERGENCIES

**11<sup>1</sup>** NOTIFICATIONS OF ACCIDENTS AND INCIDENTS (\*AIR LAW)

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**11<sup>2</sup>** DISTRESS AND URGENT RADIO CALLS AND SIGNALS (\*AIR LAW)

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If something happened during a flight that could have or did affect the safety of the crew, aircraft or others, the CAA needs to be informed. In emergency situations, there are standard procedures which are shared amongst all aircraft and services so that clear messages can be communicated in order for help to arrive as soon as possible and the best advice can be given. Having a good working knowledge of these procedures is essential knowledge for private pilots.

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## 11<sup>1</sup>

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### **NOTIFICATIONS OF ACCIDENTS AND INCIDENTS (\*REQUIRED FOR AIR LAW)**

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*Accidents, Incidents and Statistics: CAR Part 12*

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#### **What is an accident?**

An accident is defined by the CAA as an occurrence associated with the operation of an aircraft, with the intention of flight, that takes place between the boarding an aircraft and the complete disembarkation (with the propellers or rotors coming to rest), that results in:

- A person being fatally or seriously injured
- An aircraft being damaged
- An aircraft going missing or becoming completely inaccessible

#### **When and how must the CAA be notified regarding accidents?**

A pilot is required to notify the CAA of an accident as soon as practically possible (0508 ACCIDENT, monitored 24 hours). If unable, the operator or owner must do so. Following notification, the CAA must receive a written **report within 10 days** of the accident (CA005 form). The information required will include:

- |  |   |
|--|---|
| • Date and time of accident                          | • Position or last known aircraft position                          |
| • Nature of accident                                 | • Relevant weather information                                      |
| • Type, nationality and registration of the aircraft | • Type of operation and intentions (departure and intended landing) |
| • Pilot in command                                   | • Description of damages to aircraft                                |
| • Aircraft owner or operator                         | • Casualties and injuries sustained                                 |

#### **How does this differ from an incident?**

An incident is defined by the CAA as an occurrence, other than an accident, associated with the operation of an aircraft that affects or may potentially affect its safe operation.

The CAA must also be notified of an incident as soon as practical (0508 4SAFETY), if it is serious or an immediate hazard to flight safety, or by written **report within 14 days**. Incidents

may be related to general operations, dangerous goods, aircraft security, airspace incidents or a defect resulting from bird incidents.

### **Is it permissible to deviate from the CAA Rules in emergencies?**

A pilot may deviate from the Civil Aviation Rules in the case of an emergency situation i.e. when danger is present to either life or property. The prerequisites to this are:

- Breach of the rules must only go as far as necessary to deal with the emergency
- There was no alternative
- Danger in complying with the rules was greater than non-compliance of the rules

If a breach of the Rules was required to deal with an emergency, the pilot in command must notify the relevant Air Traffic Control unit as soon as possible. A written report to the CAA detailing the circumstances of this action must also be submitted.

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## **11<sup>2</sup>**

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### **DISTRESS AND URGENT RADIO CALLS AND SIGNALS (\*AIR LAW)**

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*Transmission of MAYDAY and PAN PAN Messages: Vol 4 ENR 1.15 – 1 (PINK)*

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#### **What is a “Mayday” call?**

“Mayday” is an internationally recognized aircraft distress call. It is reserved for aircraft threatened by **serious and/or imminent danger and requiring immediate assistance**. This may include:

- Control surface damage
- Structural failure
- Engine failure that will result in forced landing/ditching
- Onboard fire
- Spatial disorientation

#### **How does this differ from a “Pan Pan” call?**

A “PAN PAN” is for **urgent situations i.e. not immediately life threatening**, but could become life threatening without prompt action. It might regard the safety of someone on board or the aircraft itself. It also includes:

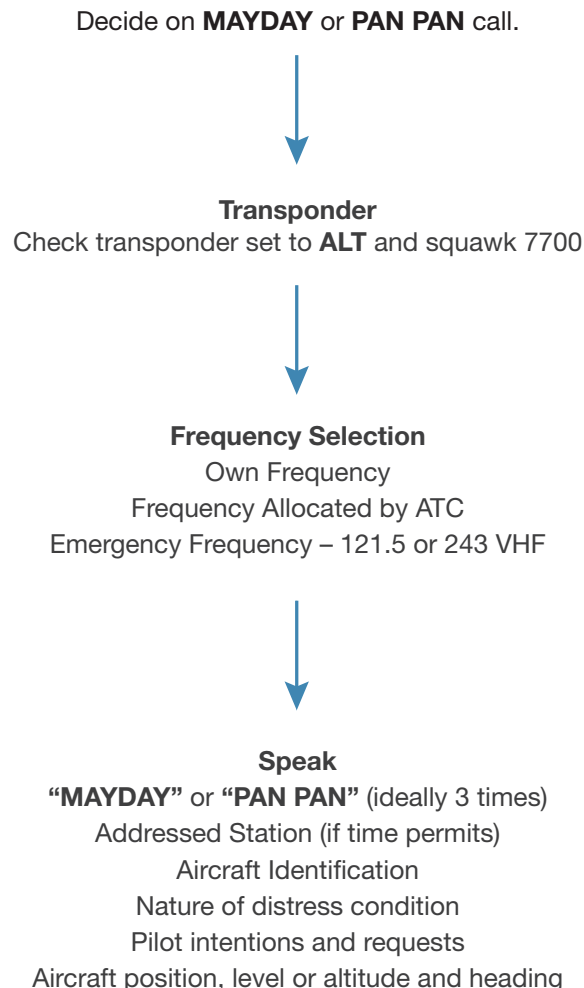
- Becoming Lost
- Aircraft system failure requiring immediate route/altitude change or diversion to land e.g. rough running of the engine
- Other emergencies that require immediate assistance or at least priority landing and attention from the ground e.g. an unwell passenger

## How are distress or urgency radio calls made?

There is a prescribed procedure for making a “MAYDAY” or “PAN PAN” distress call as shown in *Figure 51*. More importantly, however, is that the pilot communicates effectively as much information as possible to the ATC in order to organise immediate assistance. Remember that the VHF radio is limited to line of sight, so being at higher altitude will increase the range. In the first instance, the first distress call should be made on frequency currently being used. If this is unattended, alternatives would include:

- Frequency of the nearest ATC
- International emergency frequencies of VHF 121.5 MHz or 243 MHz (these are monitored by control towers, military stations, and radar facilities).
- Christchurch information (for the area you are in)
- HF radio, 2182 KHz is an emergency frequency monitored by the coast guard

A station in control will acknowledge a distress call e.g. “TCO, TAURANGA TOWER, MAYDAY”.



*Figure 51. Procedure for making a distress or urgency call.*

When possible, other useful information that may be passed on includes:

- Persons on board
- Fuel quantity
- Weather (if applicable)
- Emergency equipment, especially if an ELT (Emergency Locator Transmitter, see below) is available
- Any other useful information

### **How can radio silence be enforced?**

When an emergency communication is interrupted, the station or the pilot may issue “STOP TRANSMITTING, MAYDAY”. This initiates radio silence and has to be adhered to. It is a severe criminal offence to interfere with a distress radio transmission.

### **What should be done on hearing a distress signal?**

A pilot should continue to listen, until assistance has been provided. If it becomes apparent that the station being called is not receiving the emergency call, any station may attempt to contact the aircraft and provide assistance e.g. by relaying messages. After contact has been made, ATC may move you or other aircraft to another frequency to keep the frequency clear.

### **Can a distress call be cancelled?**

Yes, it can. If a situation comes back under control and the emergency is resolved, the distress call can be cancelled. The phrase “CANCEL MAYDAY/PAN PAN” is used.

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## 11<sup>3</sup>

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## **COMMUNICATING EMERGENCIES**

### **How can the aircraft transponder be used to communicate an emergency?**

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*Emergency SSR Transponder Codes: Vol 4 ENR 1.6 - 5*

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The SSR transponders fitted in aircraft can be used to signal emergency aircraft states. Specific codes (*Figure 52*) are internationally recognized as emergency transponder codes. When set, the transponder will send out signals that can be received by air traffic services (ATS) and emergency services to identify the aircraft as in need of urgent assistance.

EMERGENCY TRANSPONDER CODES	
<b>7700</b>	Emergency
<b>7600</b>	Radio Failure
<b>7500</b>	Unlawful Interference (Hijack)

*Figure 52. Table showing the emergency transponder codes that should be tuned in the event of emergency. An example of emergency for 7700 code is an engine failure.*

If emergency transponder codes are squawked, an ATS will try contact the aircraft via radio in the first instance. They will try to verify an emergency, use unmodulated speech technique for loss of communications (see below) and attempt to verify an unlawful interference. In this case, they will wait to also hear the pilot say, “CHANNEL SEVEN FIVE ZERO ZERO” as verification or ask, “TANGO CHARLIE OSCAR, CONFIRMING SQUAWKING SEVEN FIVE ZERO ZERO”. In all instances, action will be initiated anyway, until advised otherwise by the pilot in command.

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*“75 taken alive, 76 need a fix, 77 going to heaven”*

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## What is an Emergency Locator Transmitter (ELT)?

The emergency locator transmitter (ELT) is a safety device fitted to an aircraft in order to help search and rescue teams locate an aircraft it when in distress. When activated, an ELT will transmit a unique code (and its exact position, if GPS coded) on the international emergency frequencies 121.5 MHz and 406 Mhz. The 406 Mhz frequency is monitored by the National Rescue Coordination Centre who will confirm the registration and raise the alarm. The transmission on 121.5 MHz can be picked up as an alarm by any aircraft that have the frequency set on their second radio and enables homing to the beacon by suitably equipped aircraft.

## How are Emergency Location Transmitters (ELTs) activated?

### **Emergency Activation**

Modern fitted ELTs will automatically activate when set to “**ARM**” and a significant decelerative force is sensed i.e. forced landings, aircraft collision. Activation of the ELT is usually signified by a flashing LED and the alarm heard on 121.5 MHz. ELTs can also be activated manually in flight (“**ON**”), in order to reduce the delay in alerting and commencing search and rescue actions whilst still airborne. Note that some ELTs (as well as PLBS, Personal Locator Beacons) are exclusively manual, so will require to be switched on in the event of an emergency.

If the emergency is averted, the ELT can be switched back to “**ARM**” and ATC should be updated as soon as possible in order to cease activation of search and rescue teams.

**Forced Landings**

During a forced landing, the pilot must attempt to turn the ELT into “ON” whilst at altitude. This will allow the rescue coordination centre a better opportunity to obtain its location, increasing the utility of the ELT. If the emergency is averted then the ELT can be switched back to “ARM” and ATC updated as soon as possible to cease activation of the search and rescue teams.

**Inadvertent Activation**

As decelerative forces cause activation of the ELT, this can occur as a result of a heavy landing. The flashing LED light would indicate it has been activated. This can be confirmed by listening to 121.5 MHz for the alarm. To cancel this activation, the ELT needs to be turned to “ON” for less than 5 seconds and then back to its original position in flight of “ARM”. The nearest ATC or ideally the Rescue Control Centre, must also be notified as soon as possible. There is no penalty for inadvertent activation.

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*As some ELTs need to be switched on manually in the event of an emergency, so ensure that you are aware of what type is fitted to your aircraft.*

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**How can the ELT be tested?**

Self-testing of the ELT can be done as “pilot maintenance” if:

- Pilot has had specific training
- Conducted at a specific time – only in the first 5 minutes of an hour
- Is not conducted in flight
- Alarm not allowed to go on for more than 5 sweeps

**What actions should be taken upon hearing an ELT signal?**

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*ELT Procedures: Vol 4 GEN 3.6 - 12*

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If an ELT signal is heard (on 121.5 Mhz), pilots must forward this to the nearest ATS unit. The information they will want includes:

- Aircraft position and time when signal was first heard
- Aircraft position and time when signal was last heard
- Aircraft position at maximum strength signal
- Strength and frequency of emergency signal on 121.5 MHz

**What are the emergency ground-air visual codes?**

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*Ground to Air Visual Signal Codes: Vol 4 GEN 3.6 – 10*

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Survivors of an accident can use the codes shown in *Figure 53* to pass messages to overhead aircraft. Symbols should ideally be at least 2.5 m high and have maximum colour contrast. Other means such as radio, signal lights, flares or smoke should also be considered.

REQUIRE ASSISTANCE	V
REQUIRE MEDICAL ASSISTANCE	X
NO OR NEGATIVE	N
YES OR AFFIRMATIVE	Y
PROCEEDING IN THIS DIRECTION	↑

*Figure 53. Table of Ground to air emergency signals.*

## How can rescue services be directed by an overhead aircraft?

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*Search and Rescue Services and Procedures: Vol 4 GEN 3.6 – 1 & 6*

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If you find yourself overhead an incident in an aircraft (over land or sea), rescue services can be directed over the radio with precise instructions. If this is not available, other means can be tried as described below.

To attract the attention of the rescue craft:

- Circle the surface craft
- Cross the projected path of the craft at low altitude and rock the aircraft wings or open/close the throttle or change the propeller pitch

To direct the rescue craft:

- Once attention is obtained, head in the direction to be followed by the rescue craft

To stop directing the rescue craft:

- Cross astern of the craft at low altitude and rock the aircraft wings or open/close the throttle or change the propeller pitch



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## AIRCRAFT LOSS OF COMMUNICATIONS (\*AIR LAW)

### What should be checked when the radio is “not working”?

Aircraft radios are generally reliable pieces of equipment. Be sure there is no error in use or set up using the following checks:

#### **Power**

- Avionics or Radio master switch is in the “ON” position.
- Are the LED lights on the frequency display illuminated?
- Does the transmit light illuminate when the microphone key is pressed?
- Check radio circuit breakers

#### **Listen**

- Can you hear other communications?

#### **Test**

- Check volume on headset
- Turn the squelch up and listen for static noise
- Check connectors and microphone position

### What corrective action can be taken/attempted in case of radio failure?

The following actions should be considered:

- If you have recently had a frequency change, go back to the old frequency.
- Try an alternative frequency (if available) e.g. Christchurch information
- **Relay the message** – request another aircraft to transmit the message back to the ground.
- Increase altitude to improve VHF range (if permitted)
- **Transmit blind radio calls** – continue to transmit without being able to hear any response. This can be done by stating “TRANSMITTING BLIND...”

### What happens if the radio fails?

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*VFR Communication Failure: Vol 4 ENR 1.15 - 9*

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### ***Within Controlled Airspace***

If radio communication fails within controlled airspace, then the following process should be followed:

- Maintain terrain clearance
- Squawk 7600
- Attempt to use any published secondary frequencies
- Check radio equipment
- Listen to ATIS (if possible)
- Transmit position report with the prefix “TRANSMITTING BLIND”
- Turn on all aircraft lights
- Try mobile phone (if you have signal)
- Proceed to alternate destination outside a mandatory broadcast zone (unless the PIC determines this risk would be greater than proceeding as planned).
- Divert to unattended aerodrome for landing (again balancing risk)
- If unable to divert, enter control zone by published arrival procedures and approach on side of main runway or perform overhead join procedure. If this the case, contact ATC as soon as possible upon landing.

### ***Within Uncontrolled Airspace***

- Maintain terrain clearance and consider climbing to a higher altitude (to improve visibility)
- Squawk 7600
- Do not enter controlled airspace, unless clearance has been received and acknowledged or is in keeping with the failed communications procedures at that aerodrome

## **What if I can hear transmissions but cannot transmit myself?**

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*Speechless Technique Using Unmodulated Transmissions: Vol 4 ENR 1.15 - 11*

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A speechless radio technique has been developed for instances when the radio transmitter is functional but is unable to transmit voice. This is known as unmodulated transmission. If ATS pick up that someone is trying to communicate using unmodulated transmission, the ATS will try to confirm unmodulated transmission by asking the pilot to activate the transmitter three times or perform a manoeuvre. Once confirmed, the ATS operator will continue to ask “Yes/No” questions and the code shown in *Figure 54* should be used to reply.

PROCEDURES DURING RADIO MICROPHONE FAILURE	
YES or ROGER	Activate transmitter 1 time
NO	Activate transmitter 2 times
SAY AGAIN	Activate transmitter 3 times
AT NOMINATED POSITION	Activate transmitter 4 times







**Figure 54.** Table showing procedures used during radio microphone failure and the unmodulated/speechless technique.

## If radio communications fail at an aerodrome, what other means can controllers use to communicate with an aircraft in flight?

### Light Signals

*Aerodrome Control to Aircraft: Vol 4 AD 1.9 – 1*

If all else fails, light signals can be used. These are presented in *Figure 55*.


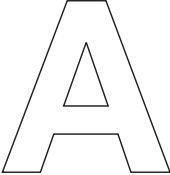
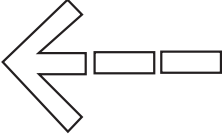
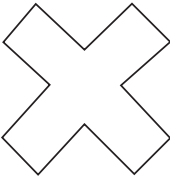
COLOUR & SIGNAL TYPE	MOVEMENT OF VEHICLES EQUIPMENT & PERSONNEL	AIRCRAFT ON THE GROUND	AIRCRAFT IN FLIGHT
 Steady Green	Cleared to cross/ Proceed to go	Cleared for takeoff	Cleared to land
 Flashing Green	NOT USED	Cleared for taxi	Return for landing (followed by Steady green to continue)
 Steady Red	Stop	Stop	Give way to other aircraft and continue circling
 Flashing Red	Clear the taxiway/ runway	Taxi clear of runway in use	Airport unsafe, do not land
 Flashing White	Return to starting point on airport	Return to starting point on airport	Land at this aerodrome and proceed to apron
 Alternating Red &/ Green	Exercise extreme condition	Exercise extreme condition	Exercise extreme condition

**Figure 55.** Table showing light signals used by aerodromes.

## Ground Signals

*Aerodrome Ground Signals: Vol 4 AD 1.9 - 3*

The AIP lists four ground signals that can be used and are shown in *Figure 56*.

AERODROME GROUND SIGNALS	
	Dropping is active and cone points towards wind
	Agricultural operations are active or training conducted and traffic may not be compliant with circuit traffic directions
	Gliding is in progress and towed off in direction of the arrow
	Ground maneuvering area (can include a runway) is out of use

*Figure 56. Table showing aerodrome ground signals.*

## What is TIBA? When is it used?

*TIBA: Vol 4 ENR 1.15 – 13 (PINK)*

Traffic information broadcasts by aircraft (TIBA) is a process used when there is significant disruption to the ATC service. When it is introduced, pilots are to provide their own separation.



A recent example of TIBA being used was following the Christchurch earthquake, where the radar building was evacuated. Notification of this occurring will be sent out in a NOTAM. In the case of total communications failure, frequencies will be as per the TIBA frequency chart published in the AIP ENR. Pilots can also initiate TIBA when complete ATS communication failure has occurred with the aim to prevent collisions. It should only be used when necessary and as a temporary measure.

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*TIBA procedures can sound complicated but they are not hugely dissimilar to operating in a Mandatory Broadcast Zone (MBZ).*

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### **What frequency should be used for TIBA?**

The frequency to be used will be issued within the NOTAM and published frequencies by regions is within the AIP ENR. It could be the frequency normally used by the aerodrome if it is a planned disruption.

### **What are the radio procedures when TIBA is in force?**

A listening watch should be conducted 10 minutes prior to entering the airspace, during flying within the airspace, and until leaving that airspace. Broadcasts need to be made:

- 10 minutes prior to entry into a TIBA airspace
- At 10 minute intervals
- Just before or after take-off
- 10 minutes prior to reaching any reporting points
- 2-5 minutes prior to changing altitude and on reaching that altitude
- At any time, the pilot deems necessary

### **What content needs to be included in a TIBA broadcast?**

The content of the TIBA broadcast should include:

- Call sign of aircraft
- Altitude
- Route
- Intended next position and time estimated at position