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ABBREVIATIONS USED IN THIS PUBLICATION

AAIB	Air Accidents Investigation Branch
ACC	Area Control Centre
ARCC	Aeronautical Rescue Co-ordination Centre
CVR	Cockpit Voice Recorder
DfT	Department for Transport
FDR	Flight Data Recorder
RAF	Royal Air Force
MoD	Ministry of Defence
MRT	Mountain Rescue Team
SAR	Search and Rescue
SRR	Search and Rescue Region
UTC	Co-ordinated Universal Time (UTC)

AIR ACCIDENTS INVESTIGATION BRANCH PUBLICATIONS



1. Foreword

The Emergency Services and the Police are usually the first trained personnel to arrive at an aircraft accident site. They can render valuable assistance to minimise injury and loss of life and reduce property loss through damage and fire. Following the rescue effort, it is important to preserve the evidence relating to factors that may have contributed to the accident. This booklet has been prepared by the Air Accidents Investigation Branch of the Department for Transport to assist these personnel in better understanding the essential processes that need to be followed in the aftermath of an aircraft accident. Additionally it details some of the hazards that may exist at aircraft accident sites.

The normal sequence of events when an accident occurs is as follows:

- The accident occurs.
- The Emergency Services respond.
- The accident is reported to the AAIB (by Air Traffic Control, the Police, the Pilot, the Operator or an eye witness).
- An AAIB 'Field' team is dispatched.
- Priority action is taken by the Police to secure accident site as the Emergency Services complete their task.
- The AAIB Team arrive and, after a site briefing from the Police incident commander, they commence an initial examination of the site wreckage, retrieve any flight recorders and collect data including any witness statements taken by the police.
- The AAIB continue their investigation and develop a Report for publication.

TO REPORT AN AIRCRAFT ACCIDENT or SERIOUS INCIDENT

Telephone the **Air Accidents Investigation Branch (AAIB)** on **01252 512299** (24 Hours)

Note: During normal working hours the above telephone number will be answered directly by personnel from the AAIB. Outside normal working hours calls will be diverted automatically to the Department for Transport Duty Officer who will, after recording some initial details, contact AAIB duty personnel.

GENERAL ENQUIRIES

Air Accidents Investigation Branch,

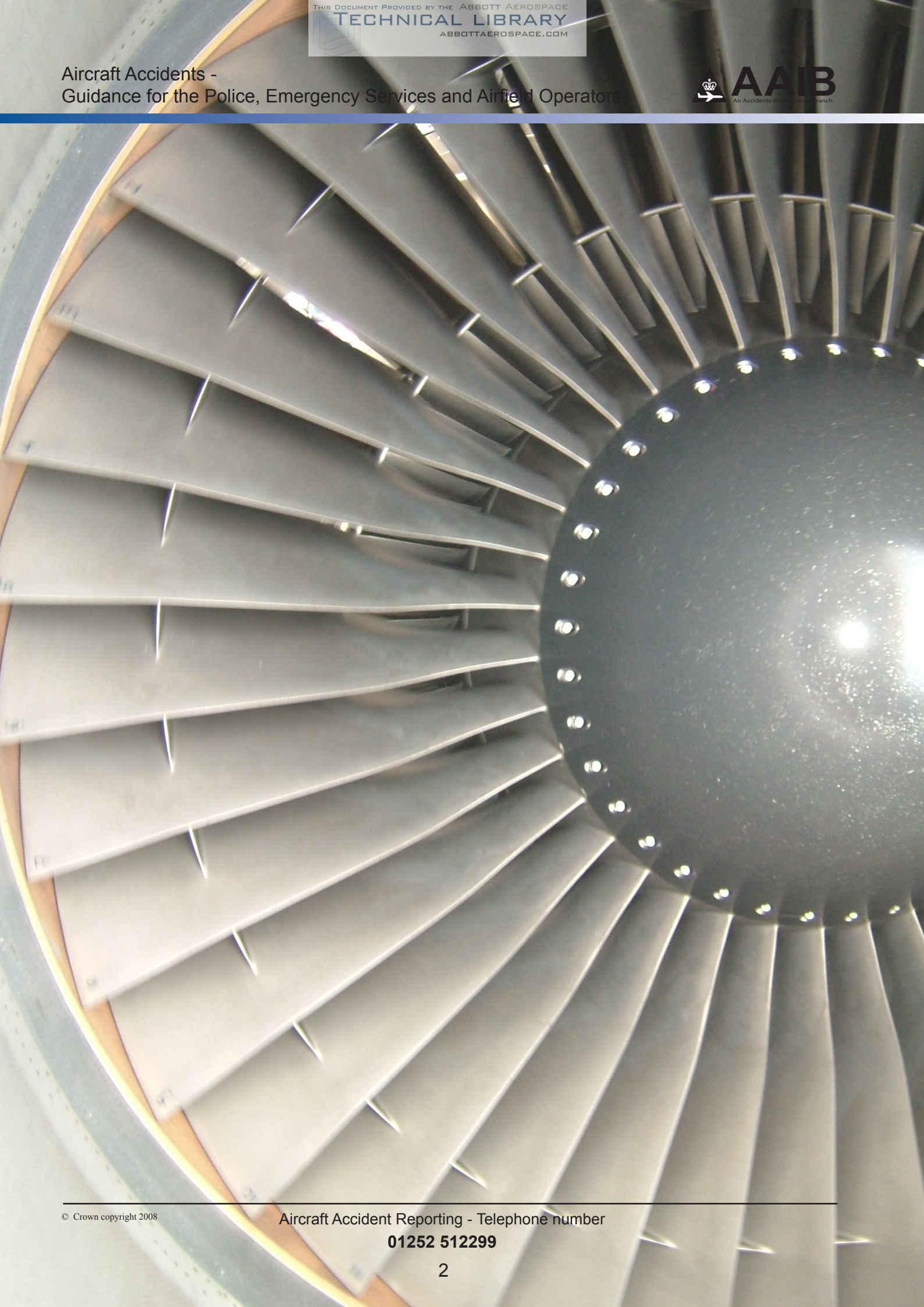
Farnborough House, Berkshire Copse Road, Aldershot, Hampshire, GU11 2HH.

Tel: 01252-510300, Fax: 01252-376999, E-mail: enquiries@aaib.gov.uk

(monitored 0830-1700 hrs Mon to Fri)

Website: www.aaib.gov.uk

Department for Transport Press Office (office hours) 0207 944 3118 (other times) 0207 944 4292



2. Introduction

The Air Accidents Investigation Branch (AAIB) is an operationally independent organisation embedded within the Department for Transport and completely separate from the Civil Aviation Authority. It is responsible for the investigation of civil aircraft accidents and serious incidents within the United Kingdom. The AAIB is also frequently called upon to assist with military and overseas investigations. The Chief Inspector of Air Accidents is responsible directly to the Secretary of State for Transport.

This guidance has been prepared to assist police, fire and other emergency services, and those involved in airfield operations and contingency planning, to inform them of the work and responsibilities of the AAIB.

3. The Role of the AAIB

Under current legislation and in conformity with International Convention the AAIB is the body responsible in the UK for the investigation of aircraft accidents and serious incidents in accordance with:

- Annex 13 to the International Civil Aviation Organisation Convention (ICAO).
- The European Union Council Directive 94/56/EC.
- Statutory Instrument No. 2798 of 1996; The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.
- Statutory Instrument No. 2693 of 2005; The Civil Aviation (Investigation of Military Air Accidents at Civil Aerodromes) Regulations 2005.

The AAIB's purpose is:

To improve aviation safety by determining the causes of air accidents and serious incidents and making safety recommendations intended to prevent recurrence.

It is not the purpose of AAIB investigations to apportion blame or liability.

In carrying out its purpose the AAIB strives to:

- Respond quickly to air accidents and serious incidents and lead and manage the accident investigation team and ensure their safety at the accident location.
- Develop and maintain effective working relationships with emergency service providers at accident sites and throughout the remainder of an investigation.
- Conduct thorough, independent, impartial and timely investigations into air accidents and serious incidents.
- Treat the survivors and relatives of victims of air accidents sympathetically and help them to understand 'what happened' and what is being done to prevent similar accidents in the future.
- Produce clearly written, thorough and concise reports with well-founded analysis and conclusions that explain the circumstances and causes of accidents and serious incidents, without attributing blame.
- Improve aviation safety in general by education and promulgating the lessons learnt from accident investigations.
- Ensure that the UK complies with its national and international statutory obligations for the investigation of air accidents and incidents.

4. The AAIB's obligation to investigate an aircraft accident or serious incident

Every reported aircraft accident or serious incident, to which the Regulations apply shall be the subject of an AAIB investigation.

Additionally the Chief Inspector of Air Accidents may take measures to investigate any incident that is not a serious incident where he or she considers that such an investigation may be expected to draw significant air safety lessons.

The extent of investigations and the procedures to be followed in carrying them out shall be determined by the Chief Inspector of Air Accidents.

5. The AAIB's authority

The authority for the AAIB to investigate aircraft accidents originates from the Civil Aviation Act 1949 (as amended).

The current statutes defining the procedures to be followed in the investigation of aircraft accidents, and the powers of the Inspectors of Air Accidents, are:

- **The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.**
- **The Civil Aviation (Investigation of Military Air Accidents at Civil Aerodromes) Regulations 2005.**

These Regulations are accessible through the AAIB website at: www.aaib.gov.uk

Separate regulations, broadly similar to the UK regulations but with minor differences, apply for accidents which occur in the Channel Islands or the Isle of Man.

6. Legal powers of an Inspector of Air Accidents

The Regulations grant legal powers to Inspectors of Air Accidents. A full list of these powers is enclosed at **Appendix A**.

The powers most relevant to an Inspector of Air Accidents working alongside the Police and Emergency Services at the site of an aircraft accident are as follows:

- To have free access to the site of the accident or incident as well as to the aircraft, its contents or its wreckage.
- To ensure an immediate listing of evidence and controlled removal of debris, or components for examination or analysis purposes.
- To take such measures for the preservation of evidence as he considers appropriate.
- To have immediate access to and use of the contents of the flight recorders and any other recordings.
- To take statements from all such persons as he thinks fit and to require any such person to make and sign a declaration of the truth of the statement made by him.

7. Authority to impound an aircraft

Some AAIB investigations involve the detailed examination or assessment of an aircraft that has not been damaged. In that case, an AAIB Inspector may impound the aircraft using his or her regulatory powers. It is important that the aircraft remains undisturbed and so the regulations specify that...

'...where an accident or serious incident occurs in or over the United Kingdom and an aircraft involved in that accident or serious incident is withdrawn from service by its operator, no person other than an authorised person shall have access to that aircraft and neither the aircraft nor its contents shall except under the authority of the Secretary of State be removed or otherwise interfered with.'

Apart from AAIB Personnel, authorised persons include any **police constable** or any **Customs and Excise officer**.

8. The relationship between Judicial Inquiries and AAIB Investigations

The Regulations make it clear that AAIB Inspectors must perform their statutory duties in cooperation with the authorities responsible for the judicial inquiry. The police may conduct an inquiry to determine if a crime has been committed and/or, if there are fatalities, they may be required to investigate on behalf of the Coroner or Procurator Fiscal pending a formal Inquest or Fatal Accident Inquiry.

The AAIB will make every effort to establish and maintain good liaison and co-operation with the Police throughout the technical investigation. The aim is to ensure that both the Police and the AAIB investigations can proceed in parallel without either body obstructing the other.

The Lord Chancellor has provided guidance on the relationship between the Police inquiries and the technical investigations conducted by bodies such as the AAIB. This guidance is entitled '**Disasters and the Law – Deciding the form of Inquiry**'. In this Memorandum the Lord Chancellor states that:

'It would require firm indications of serious criminality to justify a criminal investigation taking precedence over an inquiry held in public (or at least whose results are to be made public) where otherwise the public interest requires that such an inquiry be held. Colleagues will wish to bear in mind that the holding of such an inquiry in advance of criminal proceedings may adversely affect the ultimate prospects of a successful prosecution, but nevertheless, unless the criterion mentioned in the previous sentence is met, this is likely to be justified.'

9. Liaison between the AAIB and Police Inquiries

AAIB Inspectors often support the judicial inquiry by providing expert witness evidence to the relevant Court. However, the AAIB investigation's purpose is to establish the circumstances and causes of an accident to ensure that safety action is taken to prevent that accident occurring again. This is an international obligation placed on a State by the Convention on International Civil Aviation (The 'Chicago Convention'). The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 reflect this international obligation.

The Regulations state:

'The sole objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of this activity to apportion blame or liability.'

Consequently, it is the AAIB's responsibility, after an accident or incident, to ensure that urgent safety action is disseminated

world-wide so that the safety of the travelling public is assured whereas the police role may be to establish whether there is sufficient evidence to justify criminal proceedings.

The different responsibilities between the police inquiry and the AAIB investigation can lead to difficulties over access to an accident site and access to witnesses. There may also be potential conflicts over the gathering and retention of evidence, and the need to protect the safety of people within the inner cordon. These conflicts should and can be resolved 'on-site' through explanation, cooperation and negotiation.

10. What is a reportable Aircraft Accident

The full definitions of an aircraft accident and serious incident are contained in Regulation 2 of SI 2798 of 1996; The Civil Aviation (Investigation of Air Accidents and Incidents Regulations) 1996, the relevant extracts of which are shown in **Appendix B**.

Briefly an **aircraft accident** is an occurrence, during the period of operation of an aircraft, where the aircraft incurs damage (with certain exceptions) or in which any person suffers death or serious injury.

A **serious incident** is defined as 'an incident involving circumstances indicating that an accident nearly occurred'; it is unlikely to involve the police or the emergency services, other than those based at airports.

11. Reporting an Aircraft Accident

The legal responsibility for notification of an aircraft accident or serious incident rests first with the commander of the aircraft or, if he/she is killed or incapacitated, then the operator. If the accident occurs on or adjacent to an aerodrome, then the aerodrome authority is also required to notify the accident.

In practice, initial information usually reaches the AAIB from the Police dealing with the accident but reports can come from Air Traffic Control (ATC), an Airport Authority, the Pilot, or a member of the public. Anyone learning of an aircraft accident or serious incident should, in addition to alerting the Police and the Emergency Services, report the accident to the AAIB as soon as possible.

Initial reports to the AAIB should be made by telephone to **01252 512299**.

The person reporting an accident directly to the AAIB is also required to inform the local police of the accident and the place where it occurred. This may be the first information received by the police, although it is more likely that additional information will have already come to them through emergency calls. The police should immediately telephone the AAIB accident reporting line on:

01252 512299

and pass on as much additional information as is available.

The Police should also inform the appropriate civil air traffic Area Control Centre (ACC) whose contact telephone numbers are given in **Appendix B**. These are:

- The London Area Control Centre (LACC) at Swanwick for accidents occurring in England, the Channel Islands or the Isle of Man.
- The Scottish Area Control Centre (SACC) at Prestwick for accidents occurring in Scotland and Northern Ireland.

General enquiries, of a less urgent nature, should be made via the AAIB Switchboard during office hours, or if out of hours, the DfT Duty Officer.

AAIB Contact details

Reporting an aircraft accident or incident:

- 01252 512299

General enquiries, of a less urgent nature:

- During office hours

AAIB switchboard 01252 510300
or **enquiries@aaib.gov.uk**

- Outside office hours:

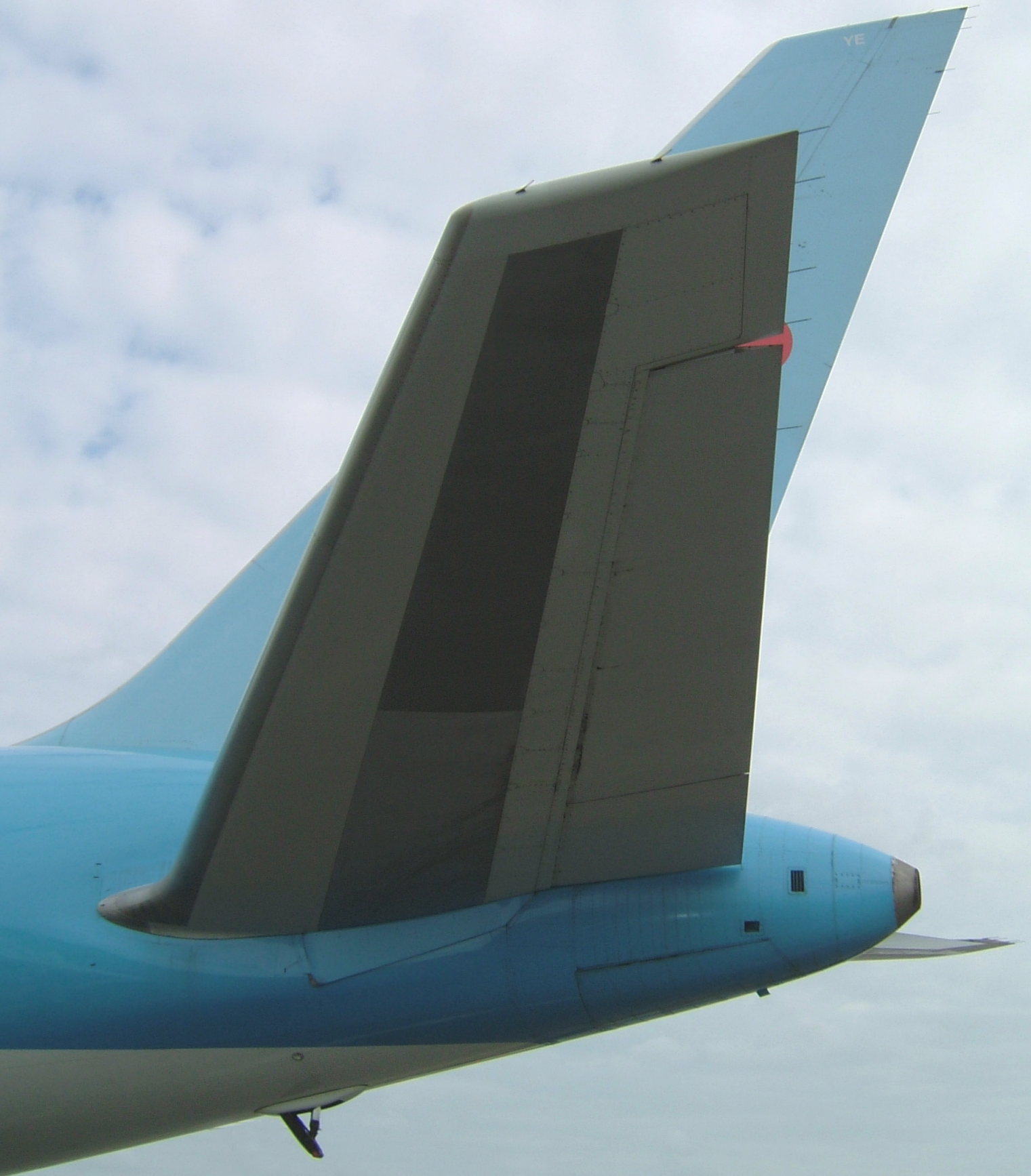
DfT Duty Officer 0207 944 5999

- 24hrs fax line:

01252 376999.



AAIB HQ at Farnborough



12. What the AAIB need to know

The reporting authority should report the following details where possible:

- Aircraft type (eg Boeing 737, Airbus A320)
- Aircraft registration (letters or numbers).
- Name of the owner or operator, or military operating unit.
- Names of the pilot/crew and any other people on board.
- Date and time of the accident.
- Aircraft's last departure point and its intended destination.
- Location of the accident, including directions on how to reach the scene and/or any designated rendezvous point (RVP).
- Extent of any injuries to the occupant(s) or others.
- Nature of the accident ie Phase of flight (eg takeoff, landing etc), and a general description of the occurrence.
- Extent of damage to the aircraft. (A specimen Notification FAX is shown at **Appendix C**).

Notification should not be delayed even though all the information may not yet be available.

Note:

UK Civil aircraft

UK civil aircraft registrations begin with the letters G followed by four additional letters (eg G-ABCD). If no 'G' prefix is apparent the aircraft may be a foreign civil aircraft or a military aircraft. Be aware that fire may have consumed part of the registration. The registration marks normally appear on each side of the fuselage (main body), the tail fin/rudder combination and the wings. Details of UK aircraft registrations and their registered owners can be found on the Internet at the following address:

<http://www.caa.co.uk/application.aspx?categoryid+60&pagetype=65&applicationid=1>
(or search under G-INFO)

Foreign Civil Aircraft

It is difficult to predict how a foreign civil aircraft may be identified. Some countries use five letter codes (eg D-EFGH) and others use a mixture of letters and numbers (eg N803DE). The country's national flag is sometimes located on the tail fin.

UK Military aircraft

UK military aircraft registrations/tail numbers are made up of two letters and three numbers (eg XL513) on either side of the fuselage. In addition, the aircraft may carry some form of squadron or unit identification found on the wings and the tail fin/rudder combination.

Foreign Military Aircraft

It is difficult to predict how a foreign military aircraft may be identified, but as a general rule, military aircraft serial numbers are painted on either side of the fuselage, with the country's national flag located either on the wings or on the tail fin/rudder combination.

Missing or overdue aircraft

If an aircraft is reported missing or overdue, the police may be alerted by a local aerodrome authority, an Air Traffic Control Centre (ATCC) or the Aeronautical Rescue Co-ordination Centre (ARCC) at RAF Kinloss in Scotland. When this happens it is essential that a close liaison is established and maintained with the ARCC.

Normally the ARCC alerts the AAIB when they have sufficient evidence to conclude that an accident has probably occurred even though the accident site has not been located. Relevant extracts from the UK Aeronautical Information Publication concerning Search and Rescue (SAR) procedures are included at **Appendix D**.

13. The AAIB response

The AAIB Duty Co-ordinator will decide the AAIB's response depending on the location and circumstances of the accident/serious incident and whether it involves a civilian and/or military aircraft.

The AAIB will respond to a notification of an accident in accordance with the following guidelines:



Example of an aircraft accident site

Major aviation disasters

- The AAIB will deploy a team of Inspectors led by a senior member of staff for a major aviation disaster.
- The AAIB HQ at Farnborough will be manned and specialist resources will be prepared for dispatch to support the on-site investigation team.
- An AAIB Principal Inspector will be deployed to lead the team as the **Investigator-in-Charge (IIC)** - (equivalent to the police 'silver' commander).
- The **Chief Inspector (CIAA)** or his deputy, contactable through the AAIB HQ, will act as the equivalent to the police 'gold' commander.
- The AAIB team may be augmented by investigators and advisors from other countries who have rights of participation under international agreements.
- The AAIB will provide advisors for safety management of the site.
- Where required, the AAIB will normally organise the recovery of wreckage using all available resources, including MOD assets.

Fatal accidents or serious incidents

Fatal light aircraft or microlight aircraft accidents and significant accidents or serious incidents involving commercial air transport aircraft will be investigated by a small AAIB Field Investigation team. Their time of arrival on scene will vary according to the location and distance from Farnborough, and they may not arrive until first light the following day.

Minor accidents to light aircraft and microlight aircraft

The AAIB will not normally deploy a team of investigators for minor accidents to privately operated aircraft (ie those not engaged in commercial air transport) in which no one suffers a fatal injury or injuries that are potentially life-threatening. Such accidents are usually investigated by AAIB Inspectors through correspondence and telephone calls. In these circumstances the wreckage should not be disposed of without the permission of the AAIB.

Parachutists and powered parachutes

A parachute is not classified as an aircraft. Consequently, if a parachutist is killed or has an accident it will be the police, with the assistance of the **British Parachute Association (BPA)**, who will investigate. The AAIB has no remit to investigate unless the accident was caused by the parachutist striking the jump aircraft or another aircraft during the descent. However, some powered parachutes are classified as aircraft,

particularly if the pilot has a seat upon a wheeled vehicle used for takeoff and landing. Occurrences involving powered parachutes will be treated as sport aviation accidents as described below.

Sport aviation accidents (gliding, hang gliding and paragliding)

Fatal accidents in these categories may be investigated by AAIB Inspectors who may visit the scene. The investigation team may be augmented by a member of the relevant sporting Association. Contact details for the various Sport Aviation Associations can be obtained from the AAIB directly or through the DfT Duty Officer on:

0207 944 5999

As a general rule, the investigation into any non-fatal accident involving a glider, hang glider or paraglider may be carried out either by the AAIB or by the relevant Association. AAIB Inspectors are unlikely to attend the scene unless the circumstances are in some way remarkable.

Balloons and airships

The AAIB normally carries out an investigation if a balloon or airship is carrying fare paying passengers. However, AAIB Inspectors may not attend the scene unless there are serious injuries or a fatality. Some accidents are investigated by correspondence although the investigation of minor accidents is sometimes carried out by the **British Balloon and Airship Club (BBAC)**.

Note:

If AAIB Inspectors are not to be sent to the site, the police will be informed as soon as possible. If appropriate, the police will be asked to give all possible assistance to the representative from the appropriate sport aviation organisation.

Military aircraft

The AAIB will not automatically respond to a military aircraft accident. Under normal circumstances the military authorities will conduct their own investigation although the AAIB might be invited to participate. However, if the accident occurs at or near a civilian airfield, the AAIB will conduct an investigation into the civil aspects of the occurrence. Initial reports of a military accident should be made to the Deputy Chief of Defence Staff Duty Officer on **0207 218 8938**.

14. Fire fighting

To ensure the maximum preservation of evidence, it is vital that any fire is extinguished as soon as possible. Where possible post-impact fires or smouldering debris should be extinguished/cooled to limit the loss of evidence and to reduce the occupational health risks at site.

As soon as all has been done to save life and minimise injury, the wreckage and accident site should be disturbed as little as possible.

Fire fighters are requested to use fire fighting foam only where it is necessary as its use can on occasions inadvertently increase risks. The foam blanket may hide safety hazards or increase the risks from exposure to hazards, as well as covering human remains and hiding or damaging vital evidence. Therefore, it is requested that the laying of a *precautionary* foam carpet should only be carried out when a real and significant fire hazard exists.



15. Rescue of personnel from crashed aircraft

Note: Parts of this section are for guidance only. Trained emergency services personnel should follow their own established procedures.

Rescue and the care of survivors is the first priority at an aircraft accident site. If survivors appear to be in the aircraft and rescue appears possible, consider the following:

- Use care in approaching the main wreckage by vehicle, particularly if the approach is along the crash path, as survivors may have been ejected from disrupted fuselages. It is possible that first responders on the scene may find no one else present in the wreckage or at the site. The aircraft occupants may have parachuted to safety, may have survived and left the scene to seek assistance, or may have been consumed in the wreckage.
- Approach the site from upwind (with the wind at your back) to avoid inhalation of gases, vapours and burning materials which are hazardous and toxic.
- A wide variety of hazards may be present at air accident sites, and can pose variable levels of risk to response personnel. Fuel and other flammable fluids, damaged and unstable structures, stored energy systems, blood-borne pathogens and products of combustion, are some of the hazards that need to be considered. Suitable control measures should be applied to ensure that risks are adequately controlled. Emergency response organisations will no doubt incorporate hazards details into their risk assessment/management process.
- Look around the crash path, and maintain a clear observation of the accident site and associated hazards.
- Render first aid and care to survivors where possible, until relieved by medical personnel.
- Attempt to account for all occupants. The airline, operator, or ATC may be able to provide details of the number of persons onboard. Consider that where the aircraft has disintegrated in flight, the wreckage, survivors and casualties may be scattered over a large area.
- Summon medical assistance if required and, in due course, verify that this assistance has been sought. Ensure that casualties still present at the accident site are provided with adequate protection against potential site hazards.
- If there are risks of a spreading post-accident fire or possible explosion from fuels or armaments, move survivors a safe distance from the scene. If survivors contaminated with hazardous substances require immediate evacuation to medical facilities, they should be decontaminated if possible prior to being removed. For example, military aircrew life vests contain explosives and hazardous materials and civil life jackets that are not inflated may contain pressurised gas bottles. These should be removed and stowed in a safe location at the accident site.



Commercial aircraft tyres can be pressurised to 250 psi, and can deflate explosively if damaged by fire and/or impact

Access

In general, information related to access, rescue and the operation of doors and canopies, will often be printed in red or black and yellow text on the aircraft.

For the purpose of rescue on **military aircraft**, the location of access doors, hatches, break-in points and cut-out panels are generally indicated on the external surfaces by a yellow arrow, bordered in black.



Typical external door handle markings



Military aircraft rescue markings

On **civil aircraft**, the position of emergency equipment on aircraft, which is accessible from outside the aircraft, is generally indicated by a silhouette with an associated written description. Markings indicating where a first-aid kit is carried will often be found adjacent to an access panel or door from which the kit is accessible.

For access doors and hatches a red arrow will indicate the external controls with the operating instructions for the controls nearby. At break-in points and cut-out panels the arrow will indicate an area delineated by a broken line (usually yellow). This area may be cut out to gain entry to an aircraft interior should access doors be blocked or inoperative. Caution must be exercised when using cutting tools, to avoid igniting spilled fuel, cutting electrical cables, pressure lines, etc.



Emergency cutting area on aircraft fuselage

Systems requiring extra care in their operation or handling due to their containing an explosive device are generally indicated by a red or grey warning triangle.

Ejector seats may be fitted to military and ex-military aircraft. Extreme care must be taken whenever ejection seats are observed to be among the wreckage and must be treated as LIVE.

Under normal circumstances, the words "EJECTION SEAT" contained in a bright red inverted triangle, located on either side of

the cockpit fuselage is an indication that the aircraft is fitted with ejection seats.



Ejection seat warning on military/ex-military aircraft

The **“MAKING SAFE”** of ejection seats **must be left to trained personnel**. The AAIB can arrange for contractors to make ejector seats from civil aircraft safe, whilst military armaments specialists can be called to the scene of accidents involving military aircraft.



Typical ejector seat fitted to older UK ex-military aircraft

However, if surviving crew urgently need to be removed from an aircraft, utmost care is required to avoid interfering with items such as pull handles, generally colour coded with yellow and black stripes, that operate the ejection sequence as these can inflict fatal injuries.

Military aircraft may also have weapons, and armaments pods onboard, whilst civil and military Search and Rescue (SAR) helicopters and aircraft carry a variety of pyrotechnics.

The **“MAKING SAFE”** and removal of these items must be left to **trained personnel**.

Ballistic Recovery Systems

One potential hazard rescue workers may encounter on light, general aviation aircraft is an unfired, **ballistic recovery system** (sometimes called a **ballistic parachute**). These devices incorporate a parachute, deployed by a rocket which, when activated during flight, can bring a damaged or out of control aircraft safely to earth.

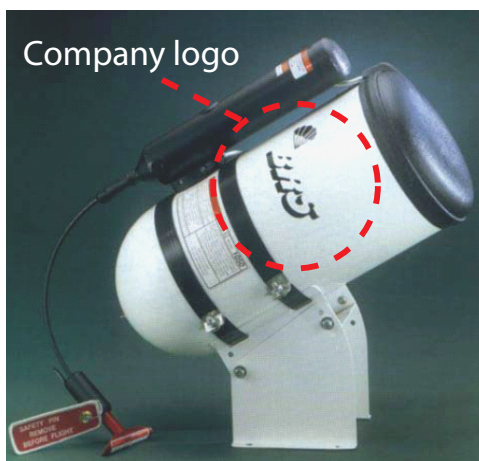
If an aircraft, having a ballistic recovery system fitted, is involved in an accident, **the un-deployed rocket can present a significant risk of injury** to rescuers and response personnel.

Rescue personnel responding to an accident involving light general aviation aircraft should look for warning signs or company logos indicating the fitment of a ballistic recovery system. These are usually positioned on the sides and/or on the upper surface of the fuselage, and/or on the parachute container.

BRS may be produced or installed by a variety of manufacturers, and warning signs and company logos can be variable in appearance. Some examples are shown below.



Ballistic recovery system warning sign



Typical BRS **Canister** system commonly used in ultralight and sport aircraft illustrating the manufacturers logo



Warning sign found on some aircraft

WARNING!
ROCKET PARACHUTE FOR DEPLOYMENT
INSIDE
STAY CLEAR WHEN OCCUPIED

Warning text found on some aircraft

A **BRS** unit is comprised of four major elements: Activation Handle, activation cable, rocket motor assembly and parachute container.

The BRS is initiated by pulling the activation handle, which is located in the cockpit. The rocket motor (about 1½-2 inches diameter and 8-10 inches long) then accelerates to over 100 mph in the first tenth of a second after ignition. It is the operation of the rocket which presents a significant risk of injury to personnel.

A **red firing handle**, connected by flexible cable to the igniter in the activation housing, is located near the pilot seats.



BRS activation handles

Each type of handle is secured with a safety pin which is intended to be removed prior to flight.

The parachute may be housed in a fabric, metal or composite container and mounted in a variety of locations according to aircraft design. Cables from the parachute, designed to support the aircraft, may be embedded in the aircraft structure or attached to structural components.

Following accidents, emergency response personnel should exercise extreme care when working around these systems, especially if the aircraft is severely damaged. Once components are located, ensure that a safe working zone is established around the rocket/parachute container. In addition, ensure that the activation handle or cable is not disturbed.

It is possible to make the system safe, however, it is recommended that guidance is sought before doing so. Further advice should be sought from manufacturers, or from the AAIB.

One of the current BRS manufacturers is BRS Parachutes Inc. They may be contacted online at:

<http://www.brsparachutes.com>

or by telephone at:

00 1 763 226 6110

For more detailed information regarding accident site hazards see Appendix F.

16. Survivors

In the immediate aftermath of an accident to a public transport aircraft there may be a number of survivors and injured persons in the area of the wreckage. The emergency services will ensure that the injured receive medical treatment on site with the more serious being removed to hospital. Those with minor injuries may decide to remain close to the site if they have friends or relatives trapped in the wreckage; other passengers may wish to disperse.

Experience has shown that the media will be on site very quickly. Some survivors may wish to talk to the media whereas others may consider this attention to be intrusive and prefer the media to be kept at a distance. Depending upon the circumstances, it may be better for the control and protection of the survivors to be carried out by either the

airline or the local authority. The emergency services should monitor that this is being done effectively and ensure that a record is kept of names, addresses and (if known) aircraft seat allocation.

An AAIB **passenger questionnaire** is at **Appendix E**. Its distribution to, and completion by, surviving passengers can be extremely useful for the AAIB to determine issues surrounding the use of safety equipment, emergency exits and survival.

17. Airfield operator's response

An accident or serious incident occurring at an airport is likely to cause considerable disruption, particularly if it interferes with runway operation. It is imperative that once firefighting or rescue operations are complete, the wreckage and any ground marks, are left undisturbed. The AAIB should have been informed by this point and any movement of wreckage must be agreed with the AAIB's Duty Co-ordinator. The AAIB appreciate that there will be considerable pressure to re-open any closed runways or taxiways and will work with the airport authority to minimise any delay. If the Duty Co-ordinator allows the wreckage to be moved, it will be necessary to record the distribution of the debris and ground marks, preferably by photography and video, before doing so.

Moving a large aircraft, which cannot be supported safely on its landing gear, will be a difficult and time consuming operation. It may take several days before the accident site can be cleared. During this period, the site should be cordoned off and secured, even if it is all contained within the airport boundary. This is necessary to prevent airside pass holders unwittingly damaging or disturbing either the wreckage or ground marks.

Following an accident at an airport, the AAIB will deploy to the scene as quickly as possible



and take control of the accident site. Once on-scene, the AAIB Inspectors will arrange to have the wreckage moved at the earliest opportunity taking advantage of any support the airport can offer in particular, personnel, heavy lifting equipment or storage facilities.

Although the AAIB will dictate the timescale regarding movement of the wreckage, it is the responsibility of the airport authority to decide when it is safe to re-open the runway/taxiway/airport.

18. Accident site security and initial police actions

It is the responsibility of the police to guard the wreckage and provide security for the accident site. The accident site must be identified and sealed off as soon as possible; only people required for rescue and fire-fighting should be allowed access to the wreckage.

Where accidents have occurred at night or late in the evening, examination of the wreckage will usually be postponed until first light.

When wreckage is found, and where in the opinion of the individual, it is considered to be of significance (instruments, mechanical parts etc) the location should be marked and the find should be brought to the attention of an Inspector of Air Accidents.

Following the rescue and fire fighting phases, the emergency services are asked to bear in mind that scene of an aircraft accident may or may not be a crime scene. However, it will always be a scene rich in forensic evidence. Therefore, it is important that the scene is preserved as much as possible until the AAIB Inspectors arrive.

The AAIB will attempt to keep the period during which the accident site needs to be guarded to a minimum. However, it must be appreciated that the plotting of a wreckage

trail and on site examinations can take a significant amount of time, particularly in the case of a large aircraft. Police Air Support Unit video of the accident scene can assist in this task and should be supplied to AAIB inspectors as soon as possible.

The guarding of a site can be difficult given the variability of terrain and the occasional extended areas involved. To ensure that all potential evidence is preserved it is essential that the number of people in and around the wreckage is kept to a minimum. It is all too easy for vital evidence to be destroyed by well intentioned persons disturbing wreckage, obliterating ground marks, trampling equipment into the ground, or moving switches and controls from their original positions.

The media will be well represented and it will probably require some effort to keep photographers, cameramen and journalists at an appropriate distance from the wreckage. However, press photographs taken soon after an accident, albeit from a distance, can provide a useful record of the wreckage distribution or the local weather conditions.

As well as site security the Police should consider the following initial actions:

- Record, as soon as possible, the positions in the aircraft wreckage from which any survivors of the accident were assisted.
- Leave the deceased person(s) in their original place until a pathologist can examine them. (If this procedure is likely to distress the public or relatives of the deceased, the bodies may be removed.) If a body is removed before the Coroner/Pathologist arrives, record its position and posture and attach the record to the body. It is not essential to the AAIB investigation for bodies to

be left in-situ, once they have been properly recorded.

- Take photographs, recordings or sketch items/evidence considered likely to be obliterated or lost prior to the arrival of the AAIB team.
- Secure the wreckage, including any scattered wreckage away from the main accident site, and any of the aircraft's contents or papers against loss or further damage.
- Note the names, addresses, contact details and intended movements of any witnesses to the accident.
- Admit only authorised personnel to the accident site; and keep bystanders outside the established zone of safety.
- Protect, if possible, vital areas such as the cockpit, lighter pieces of wreckage and ground scars from inclement weather by covering them with a tarpaulin. (Should coverings not be available, photography and videoing of the scene will assist the investigative team.)

Note:

It is possible for the London ACC or Scottish ACC to impose a Temporary Danger Area around the accident site. Upon request from a controlling authority (a senior police officer) a Temporary Restricted Area may be established to exclude unauthorised aircraft from the immediate area. The establishment of such an area however must be for reasons such as the preservation of evidence or to avoid interference with emergency operations and not merely for the purposes of denying overflight access by the media.

19. Accident site safety

The safety of personnel will be an important consideration for organisations involved in accident site operations.

Some aircraft may present significant hazards, for example:

- Cargo carrying aircraft
- Large passenger aircraft carrying significant cargo
- Light aircraft fitted with pyrotechnically deployed parachutes
- Military or ex-military aircraft equipped with ejection seats

The AAIB has access to specialist health and safety advice regarding hazards at aircraft accident sites and the safe recovery of aircraft wreckage. This expertise can be made available to the emergency services at an early stage of response by telephone and/or in person.

Overall responsibility for the safety at the site will usually reside with the authority in control, ie the Fire Service, Police or the AAIB. However, organisations working at the site will retain responsibility for the safety both for their own personnel and for others working under their direction.

To ensure that a high level of safety management is maintained during site operations, it is important that organisations co-operate and co-ordinate their activities. At major accident sites for example, a risk management group will be formed to assist with the safety management process. Initiation and facilitation of the group is likely to be co-ordinated by the local authority emergency planners (the AAIB may initiate this action if required). Group members should include safety co-ordinators from the main organisations involved, including the

AAIB, Police, Fire, Emergency Planners, Environment Agency, contractors, etc.

Upon completion of the fire-fighting and rescue phase, the AAIB will assume responsibility for investigation and recovery operations at site. At this stage, AAIB personnel will undertake further assessment of occupational safety hazards at site. The advice of the senior Fire or Police Officer will be sought to establish information on hazards previously identified. Specialist personnel such as scientific advisers may also be employed to assist with the assessment process. At major accident sites, this assessment phase is likely to take some time, resulting in a pause in operations before further work can continue. On completion of the assessment, suitable control measures will be introduced to ensure the safety of personnel working at or visiting the site. Control measures are likely to include limiting access to all or specific site areas, the removal or neutralising of some hazards, the use of protective clothing, restriction of traffic movement, and may also include the operation of an entry pass system.

Some incidents may have implications for public safety and, given the extent and duration of site operations in major accidents, may also have a significant impact on the daily routine of the local population. Past experience has shown that the involvement of the Local Authority, and in particular the Emergency Planning department, is essential for the effective co-ordination of non-investigation activities at and around major accident sites. The AAIB will seek to maintain a close liaison with the Local Authority to provide advice and assistance where required.

See Appendix F for more details regarding safety hazards on accident site.

20. Organisation of the investigation

With the increasing complexity of the aviation environment, eg. flight operations, aircraft systems, and air traffic control, it has become necessary for the AAIB to call on outside specialists to assist in particular aspects of specific investigations. These personnel can be co-opted from:

- The airline operator involved.
- The manufacturers of the aircraft, its engines or equipment.
- Other government agencies.

They will be formed into groups working under the direction of AAIB Inspectors. The number and scope of the groups depends on the site and complexity of the specific accident.

An **Investigator-in-Charge (IIC)** will be appointed by the Chief Inspector of Air Accidents and will be responsible to him for the overall organisation, conduct, and control of an accident investigation.

The Investigator-in-Charge will decide which specialist working groups are required and will co-ordinate and direct the efforts of the groups. The Investigator-in-Charge will also ensure that regular liaison is maintained between the AAIB, the police incident commander and the Coroner or Procurator Fiscal.

AAIB / Police liaison

The AAIB investigation team will usually have a daily meeting at the end of the day's activity. Chaired by the IIC, the meeting will discuss progress to date and formulate activity plans for the following day. It is important that the Police nominate a **liaison officer** to attend these meetings.

Likewise, subject to manpower availability, the AAIB will appoint an inspector to liaise at any daily police briefings.

21. Preservation of evidence

Modern aircraft systems are complex and vital evidence can be destroyed through inadvertent action by members of the emergency services. Therefore, the following guidelines are offered:

Removal of evidence

Apart from casualties, nothing should be removed from the scene nor should the wreckage or accident site be disturbed any more than is necessary for the extrication of persons, making the scene safe for investigators or for preserving evidence. Removal of obviously deceased persons entangled in the wreckage should not be commenced without first discussing the issues with the AAIB Duty Co-ordinator. Where such activities have to take place before Inspectors arrive, a record, preferably a photographic or video record, should be made of the disruption to the wreckage.

Coverage should include an overall view of the site and close-up of the wreckage, especially the cockpit area, and of the bodies.

Runway debris

In the case of accidents and serious incidents occurring at airports there may be debris scattered along the runways or taxiways. There is often considerable pressure to sweep the paved areas to allow operations to continue and the AAIB has no wish to cause unnecessary delays. In such circumstances the AAIB guidance is that, after obtaining the AAIB Duty Co-ordinator's agreement, the distribution of debris should be recorded, preferably by photography and video. Debris should then be moved to the edge of the paved area in a direction at right angles to the centreline. This will help investigators to reconstruct the failure sequence.

Eye-witnesses

The Police can assist the AAIB by compiling a list of witnesses, their addresses and telephone numbers and taking their initial statements. It is important that statements be strictly confined to a record of the facts as seen by the witnesses. Although the police may need these statements for their own purposes, it is important that they be made available to the AAIB. In cases where it is necessary to try and establish the final flight path of an aircraft, the number of witnesses and the area covered by them can be more important than the individual quality of their evidence. Specialist aviation knowledge on the part of a witness is no guarantee of accuracy. It is not unusual for witnesses to have photographs or video recordings of an accident, particularly at air displays. Copies of these (preferably the originals) should be requested from witnesses - they will be analysed by the AAIB and then returned to the owners.

Passenger questionnaire

Appendix E contains a Passenger Questionnaire which may be copied for local use.

Passengers should be asked to complete this questionnaire, ideally with the assistance of a police officer or a member of the support agencies, who should then ensure that it is given to an AAIB Inspector on site or returned to the AAIB at the address given on the form.

Documents

A large number of documents and papers may be carried by aircraft; the recovery and preservation of these documents may be vital.

All papers associated with an aircraft accident should be carefully collected and held, with a minimum of handling of damaged or burnt specimens.

If the **flight deck** of a public transport aircraft is intact, access should be prevented and documents not removed unless there is a risk of their loss or damage.

The documents carried often include:

- Certificate of Airworthiness
- Certificate of Registration
- Certificate of Maintenance
- Technical Log
- Load and Balance Sheets
- Passenger Manifest
- Freight Manifests
- Crew Licences
- Crew Log Books
- Navigation Log Sheets
- Aircraft and Operations Manuals
- Maps, Charts and notes etc.

Examination of such documents and analysis of the information contained in them may provide vital evidence for investigators.

Personal technology

Flight crew may carry company-issued laptop computers and mobile telephones as well as their own personal mobile telephones, cameras or PDAs. Even if they appear damaged and unusable they can contain data recorded on microchips.

Damaged items should be collected and bagged complete with their damaged components and handed to AAIB personnel.

Flight recorders

Flight Data Recorders (FDR) and Cockpit Voice Recorders (CVR), commonly referred to as 'Black Boxes', are carried by many commercial aircraft and can provide vital information to the

investigation. These recorders are painted bright orange with white reflective strips on the sides and contain crash-protected tape or memory modules where the data is stored.



Examples of typical flight recorders - the upper example shows a modern solid-state recorder with the crash-protected memory module clearly visible with the two reflective stripes

Unskilled handling of the flight recorders after a crash can cause unnecessary damage which might lead to loss of the recorded information, or at the very least, a delay in the recovery of that information.

The retrieval of the recorders after an accident is of prime importance, but electromagnetic devices of the 'mine-detector' type **should not be used** to search for these recorders because the electromagnetism can erase the recorded information.

Once a flight recorder has been located, it is imperative that its location should be marked and protected; however, if it needs to be moved, it should be handled as little as possible before retrieval by AAIB specialists.

The outer casing of older type recorders can be damaged or even destroyed in an accident, leaving only the crash-protected tape module containing the recorded data. If this module is subjected to fire or immersion in fluid it can become discoloured and difficult to identify.



An example of a partially damaged CVR and the discoloured crash-protected tape module from a damaged FDR

Other sources of recorded flight data are becoming more common on commercial aircraft. Of particular use to investigations are Ground Proximity Warning System units (GPWS) and Quick Access Recorders (QAR). These, together with many avionics boxes and engine control units, can store data into memory; however, the memory is not required to be crash protected. Therefore, as a precaution, any electronic boxes found should be protected from further damage until they can be examined or retrieved by AAIB specialists.

GPS units

GPS units are being used more and more by pilots flying smaller aircraft such as business jets, GA aircraft and gliders. Some GPS units

are panel mounted while portable/handheld units are often positioned somewhere in the cockpit by the pilot at the start of each flight. Many of these units are able to store and record track and other information in memory so should be collected and put into antistatic bags, and handed to AAIB personnel. If an antenna is still connected to the unit then this should be disconnected to prevent possible further recording of track information.



Some typical GPS units

22. The exchange of witness statements

One issue which may create difficulties, particularly for police officers and AAIB Inspectors when conducting parallel investigations, is the exchange of witness statements.

Normally, the police have no difficulty in giving copies of witness statements taken by their officers to AAIB Inspectors. However, Regulation 18 of the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 prohibits an AAIB Inspector from reciprocating.

The regulation stipulates that no **relevant record** shall be made available to any person for purposes other than accident or incident investigation unless its disclosure has been ordered by the relevant Court (The High Court in England Wales and Northern Ireland, or the Court of Sessions in Scotland).

The definition of a **relevant record** is defined within International Standards and Recommended Practices for Aircraft Accident and Incident Investigation (Annex 13 to the Convention on International Civil Aviation).

The definition includes 'all statements taken from persons by the investigation authorities in the course of their investigation'.

In this context, the investigation authority is the AAIB and not the police.

Consequently, Inspectors of Air Accidents may take formal statements from witnesses but they may not part with copies of such statements to third parties – even if the witness has no objection to a copy being given to the police or Coroner's officer.

In practice however, AAIB Inspectors prepare **three copies of a handwritten statement**. **One** is retained by the Inspector and **two** are given to the witness in the hope that one will be given to the judicial investigation, if sought, so that both investigations can benefit from the same witness evidence.

No offence is committed by the witness if he or she hands a copy of their statement to a third party. However, if a witness declines to part with a copy of their statement, they should not be compelled to do so. Instead, a police officer should take another statement.

23. Communications

The increasing use of mobile telephones has resulted in much improved communications for AAIB staff but where mobile telephone coverage is poor, a further service that the police can provide to assist the AAIB personnel in the field is in the area of communications. Use of police radio and telephone links for passing and recording messages can be very useful to the AAIB Inspectors during the on-site stage of the investigation. It is likely that AAIB vehicles and AAIB HQ will also be connected

to the police radio net enabling two way communication prior to the AAIB Inspectors arriving on scene.

24. Liaison with HM Coroner (In Scotland the Procurator Fiscal)

A Coroner, or in Scotland the Procurator Fiscal, is required to inquire into all the circumstances of a sudden, violent or unnatural death. Consequently, there will be two independent but concurrent investigations into a fatal aircraft accident.

In practice, the Coroner's Officer, the Police and the AAIB Inspectors collaborate in some areas of the investigation. Normally, the Coroner or Procurator Fiscal, will be in touch with the progress of the AAIB investigation and may consult the Investigator-in-Charge when deciding which witnesses should be called.

In Scottish Law the Procurator Fiscal is responsible for investigating any accident, whether fatal or not, resulting from a criminal act. In cases of possible criminality, the Procurator Fiscal, Police and the AAIB Inspectors collaborate in some areas of the investigation and care is taken to fulfil requirements for the preservation, gathering, securing and documenting of evidence.

Recovery of the aircraft to a secure area, usually at the AAIB's Headquarters, is normally organised by the AAIB. This recovery is often undertaken with the assistance of the Police who may wish to ensure continuity of the evidence.

In the case of a fatal accident to a hang-glider, paraglider or parachutist, and when the Chief Inspector of Air Accidents has decided not to order an investigation, the Coroner's Officers are advised to consult the officials of the organisation concerned regarding the provision of technical evidence at the inquest. Contact details for the organisation concerned can be obtained from AAIB duty personnel.

25. Pathology - aviation specialists

In the United Kingdom the AAIB team may include a medical adviser. This person is usually, but not exclusively, a specialist in aviation pathology seconded from the RAF. It is important for the pathologist, dealing with an air accident, to have a knowledge of aviation and aviation medicine. However, regardless of who conducts post-mortem examinations, Regulation 9(1)(d) of the Regulations states that AAIB Inspectors are authorised to:

'have access to the results of examination of the bodies of victims or of tests made on samples taken from bodies of victims;'

Whilst the cause of death following an aircraft accident is generally obvious in the broad sense, the standard post-mortem report may not meet the requirements of the aircraft accident investigation. In some cases the AAIB Inspector requires as much information from the pathologist's examination of the bodies of the occupants of the aircraft as he does from the engineering examination of the aircraft structure. Information which might reasonably be required of a pathologist include:

- Evidence of cause of the accident.
- Mechanical failure in the aircraft (from body injury evidence).
- Physical evidence of who was controlling the aircraft? Was there disease which could influence the function of the crew or incapacitate them?
- Toxicological. Were the crew affected by noxious fumes, drugs, or alcohol?
- Physiological. Was there a defect in the pressurisation system?
- Evidence of injury by pre-impact explosion or fire.

- Evidence of the sequence of events leading up to the accident.
- Was the accident anticipated or not?
- Evidence as to survivability.

The aviation pathologist is normally willing to act on behalf of the Coroner or Procurator Fiscal if and when they so desire. Sometimes, two pathologists cover an aircraft accident autopsy, the Coroner's or the Procurator Fiscal's pathologist being in charge and the aviation pathologist, although formally being present as an observer, taking an active part.

In Scottish Law two pathologists are necessary to conduct an autopsy where there is a possibility of criminal proceedings. Wherever possible, it would be beneficial if one pathologist is an aviation specialist.

26. Wreckage recovery

Recovery of the wreckage of public transport aircraft will normally be co-ordinated by the AAIB, on occasions with assistance from the Royal Air Force or Royal Navy. A recovery officer from one of these organisations may attend the site at an early stage to assist the investigation team and to assess the recovery resources required. Recovery of the wreckage of light aircraft and small helicopters may also be undertaken by local contractors or by AAIB personnel.



Typical wreckage recovery operation

In all accidents, the prevention of pollution or further damage to land, water course, buildings, etc will be a significant consideration from an early stage. The AAIB will advise and assist the Emergency Services, Environment Agency, utility companies, etc in gaining access to the site to limit any environmental effects.

At major accident sites, Local Authorities are likely to act as the facilitating body for this aspect of site operations. At most accident sites, representatives of the aircraft operator/insurers will also attend site at an early stage to assess liabilities and plan restoration/remediation activities. Where complex or extensive restoration work is required, agents will be appointed by the insurers to manage the project.

27. Aircraft Accidents at Sea

Rescue co-ordination

The Maritime and Coastguard Agency are responsible for the initiation and co-ordination of all civil maritime search and rescue in the United Kingdom Search and Rescue Region (UKSRR). Within the UKSRR there are six regions each comprising a Maritime Rescue Co-ordination Centre (MRCC) supported by one or more Maritime Rescue Sub Centres (MRSC). Search and rescue resources may include other ships at sea, life boats and helicopters.



The AAIB is also responsible for the investigation of aircraft accidents where the aircraft crashes into the sea

Survivors

Survivors from an aircraft that has crashed at sea may be recovered to different shore-based locations and transported to different hospitals or reception centres. It is essential that the police deploy personnel to each location to gather personal information and take witness statements if possible. These statements, especially those from surviving crew members, may be vital in determining the course of events immediately prior to the accident. A detailed list of the survivors names and addresses should be passed to the AAIB as soon as possible. Those survivors capable of recording their experiences should be given an AAIB passengers questionnaire (see **Appendix E**).

Deceased

Bodies recovered from the sea will be recovered to a shore-based mortuary for pathological examination. Where possible a pathologist, specialising in aviation matters, should be present to report his findings to the AAIB team.

Floating debris

Floating debris recovered and brought ashore during the search and rescue phase of any operation should be secured and brought to the attention of an AAIB Inspector.

Wreckage recovery from the sea

The recovery of aircraft wreckage from the sea bed can be a very expensive operation with costs varying depending on the size of the aircraft, the depth of water, the location, the weather and sea conditions etc. In some cases the AAIB will make contact with the police, the aircraft operator's insurers and the State of Registry with a view to seeking an agreement for sharing the costs of the recovery. However, the AAIB will seek to recover submerged aircraft wreckage when

it is deemed necessary for the investigation in order to establish the cause and it is practical to do so.



Wreckage recovery from the sea in good weather conditions

In some cases the AAIB may seek to recover only the flight data recorders and relevant parts of the aircraft wreckage. This may occur when recovery of all of the aircraft wreckage is impractical. On occasions, when General Aviation aircraft are involved, the AAIB will not attempt wreckage recovery. It will then be the responsibility of the aircraft owner or the aircraft's insurers to effect a recovery if it is deemed appropriate for their purposes or if the wreckage poses a hazard to shipping. In this case the 'Receiver of Wrecks' should be informed.

Only appropriate organisations, that have a proper and considered approach to risk management to manage marine search and salvage operations effectively, will be used by the AAIB to undertake marine recovery. A Memorandum of Agreement / Standing Contract and/or Sub-contract for the management of salvage operations on behalf of the AAIB is maintained with those organisations deemed appropriate.

The location and recovery of submerged aircraft wreckage is a specialist task that carries with it significant health and safety risks. All underwater location and recovery

operations, will be controlled and managed by those organisations approved for the task in co-ordination with the AAIB.

The AAIB will ascertain, at the earliest opportunity, whether any relevant wreckage is located under water. If this is the case, and the police are involved, they will be informed of the AAIB process and procedures to prevent the inappropriate use of local resources that may expose AAIB inspectors, arriving on scene, to an environment that has not been subjected to the required risk assessment.

The AAIB will make it clear to the operator of an aircraft which has crashed in or near UK waters and **sunk** that the AAIB will be undertaking the salvage and will be responsible for it. The operator should be firmly discouraged from taking unilateral action, though he (together with the manufacturer) may send an observer on board the recovery vessel if there is space and accommodation.

If the aircraft has remained **afloat**, the operator may wish to salvage his property with a view to refurbishment, in which case the AAIB will render every assistance. If the aircraft subsequently sinks then the AAIB will undertake responsibility for the salvage as before.

The AAIB will confirm with the organisation, managing the salvage project on its behalf, that the capabilities and experience of the diving contractor and his team are appropriate for the work being undertaken. This also applies to Royal Navy and Police teams.

On occasions aircraft wreckage may be visible from and close to the shore. In these circumstances AAIB Inspectors may agree local arrangements for a Police diving team to attach ropes to the wreckage and have it dragged ashore. In cases where the wreckage is reasonably expected to be visible at low tide or from a surface vessel,

Inspectors may board certain vessels for visual or echo-sounding searches. Such vessels will be professionally manned and conform to the appropriate health and safety legislation. Examples of such vessels would be RNLI lifeboats, Police launches, Coastguard vessels and Royal Navy vessels.

Recovery of aircraft recorders

Most public transport aircraft and helicopters are equipped with some form of cockpit voice and flight data recorder designed to withstand the forces involved in an aircraft accident including immersion in water under extreme pressure. These recorders can provide vital information essential to AAIB investigations. They are fitted with transmitters (Dukane Beacons) to assist with their location under water. The AAIB have the necessary equipment (a handheld receiver and a towed hydrophone array) to detect and locate these transmissions. Some AAIB Inspectors are skilled in the operation of this equipment and will deploy on the recovery vessel to assist in the recovery operation.

The recovery of bodies from within aircraft wreckage

If bodies are discovered in or near submerged aircraft wreckage they will be recovered and dealt with appropriately. It will often be desirable for a police presence on board the recovery vessel to deal with bodies on behalf of HM Coroner and co-ordinated their eventual transportation to a mortuary ashore.

28. Dealing with the Media

It is likely that the media will arrive at scene very shortly after the accident has occurred. If the media arrive before the AAIB or military authorities, for their own safety, they must remain outside the secured area.

The media will have deadlines to meet and will seek to gain official information and

take photographs of the accident site and survivors as soon as possible. News media aircraft or helicopters should be prevented from flying over or hovering near the accident site and photography of survivors or deceased persons should not be permitted.

The AAIB will endeavor, with police assistance, to provide access for the media to an area where suitable photographs may be taken and, at a suitable time, provide a short factual briefing. Members of the police and emergency services, if called upon by the media, should be aware of the need to refrain from releasing information that is outside their area of expertise. For this reason care should be exercised in the use of mobile telephones or radios, as the media may be capable of monitoring communication frequencies.

A member of the DfT press office may be on scene to deal with media requests in the event of a major disaster.

The AAIB will not release to the public or media the names of the crew, passengers, the aircraft owner or the operator. The Coroner releases the names of the deceased persons only after the next-of-kin have been informed and will often use the Police as his agents. Speculation as to the cause of the accident.

Appendix A Powers of an Inspector

Extract from The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

Powers of Inspectors

- 9.—(1)** For the purpose of enabling him to carry out an investigation into an accident or incident in the most efficient way and within the shortest time, an investigating Inspector is hereby authorised, where appropriate in co-operation with the authorities responsible for the judicial inquiry, to—
- (a) have free access to the site of the accident or incident as well as to the aircraft, its contents or its wreckage;
 - (b) ensure an immediate listing of evidence and controlled removal of debris, or components for examination or analysis purposes;
 - (c) have immediate access to and use of the contents of the flight recorders and any other recordings;
 - (d) have access to the results of examination of the bodies of victims or of tests made on samples taken from the bodies of victims;
 - (e) have immediate access to the results of examinations of the people involved in the operation of the aircraft or of tests made on samples taken from such people;
 - (f) examine witnesses; and
 - (g) have free access to any relevant information or records held by the owner, the operator or the manufacturer of the aircraft and by the authorities responsible for civil aviation or airport operation.
- (2)** For the purpose of paragraph (1) above an investigating Inspector shall have power—
- (a) by summons under his hand to call before him and examine all such persons as he thinks fit, to require such persons to answer any question or furnish any information or produce any books, papers, documents and articles which the investigating Inspector may consider relevant and to retain any such books, papers, documents and articles until the completion of the investigation;
 - (b) to take statements from all such persons as he thinks fit and to require any such person to make and sign a declaration of the truth of the statement made by him;
 - (c) on production if required of his credentials, to enter and inspect any place, building or aircraft the entry or inspection whereof appears to the investigating Inspector to be requisite for the purposes of the investigation;
 - (d) on production if required of his credentials, to remove, test, take measures for the preservation of or otherwise deal with any aircraft other than an aircraft involved in the accident or incident where it appears to the investigating Inspector requisite for the purposes of the investigation, and
 - (e) to take such measures for the preservation of evidence as he considers appropriate.
- (3)** Every person summoned by an investigating Inspector under paragraph (2)(a) above shall be allowed such expenses as the Secretary of State may determine.

Appendix A (Cont)

Powers of an Inspector

(4) When requested to do so by the investigating body or entity of another member State, the Chief Inspector may provide assistance to that body or entity by supplying—

- (a) installations, facilities and equipment for—
 - the technical investigation of wreckage and aircraft equipment and other objects relevant to the investigation,
 - the evaluation of information from flight recorders, and
 - the computer storage and evaluation of air accident data, and
- (b) accident investigation experts to undertake specific tasks but only when an investigation is opened following a major accident.

(5) In this regulation “operator” shall have the meaning given by Article 3 of the Directive and “in co-operation with the authorities responsible for the judicial inquiry” shall have the same meaning as in the Directive.

Appendix B

Definitions of an Accident and Serious Incident

Extract from the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

Accident

2.—(1) In these Regulations, unless the context otherwise requires—

“accident” means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which—

- “(a) a person suffers a fatal or serious injury as a result of—
- being in or upon the aircraft,
 - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
 - direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew, or
- (b) the aircraft sustains damage or structural failure which—
- adversely affects the structural strength, performance or flight characteristics of the aircraft, and
 - would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin; or
- (c) the aircraft is missing or is completely inaccessible;”

Fatal injury

Fatal injury means an injury which is sustained by a person in an accident and which results in his death within 30 days of the date of the accident;

Serious Injury

Serious injury means an injury which is sustained by a person in an accident and which—

- (a) requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received;
- (b) results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
- (c) involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage;
- (d) involves injury to any internal organ;
- (e) involves second or third degree burns, or any burns affecting more than 5 per cent of the body surface; or
- (f) involves verified exposure to infectious substances or harmful radiation; and “seriously injured” shall be construed accordingly;

Appendix B (Cont)

Definitions of an Accident and Serious Incident

Serious Incident

Serious incident means an incident involving circumstances indicating that an accident nearly occurred;

List of examples of serious incidents - The list is not exhaustive and only serves as a guide to the definition of 'serious incident'.

- A near collision requiring an avoidance manoeuvre or when an avoiding manoeuvre would have been appropriate to avoid a collision or an unsafe situation.
- Controlled flight into terrain (CFIT) only marginally avoided.
- An aborted take-off on a closed or engaged runway, or a take-off from such runway with marginal separation from obstacle(s).
- A landing or attempted landing on a closed or engaged runway.
- Gross failure to achieve predicted performance during take-off or initial climb.
- All fires and smoke in the passenger compartment or in cargo compartments, or engine fires, even though such fires are extinguished with extinguishing agents.
- Any events which required the emergency use of oxygen by the flight crew.
- Aircraft structural failure or engine disintegration which is not classified as an accident.
- Multiple malfunctions of one or more aircraft systems that seriously affect the operation of the aircraft.
- Any case of flight crew incapacitation in flight.
- Any fuel state which would require the declaration of an emergency by the pilot.
- Take-off or landing incidents, such as undershooting, overrunning or running off the side of runways.
- System failures, weather phenomena, operation outside the approved flight envelope or other occurrences which could have caused difficulties controlling the aircraft.
- Failure of more than one system in a redundancy system which is mandatory for flight guidance and navigation.

Appendix C
Accident Notification Fax

To: AIR ACCIDENTS INVESTIGATION BRANCH - 01252 376999

From ORGANISATION.....

Tel FAX No Date Time

A ACCIDENT INCIDENT REF No

B AIRCRAFT TYPE and REGISTRATION

C OWNER

Tel.....

OPERATOR

Tel.....

D PILOT IN COMMAND Name.....

Address

.....

.....

.....

Tel.....

E DATE & TIME (UTC) OF EVENT

F LAST POINT OF DEPARTURE

POINT OF INTENDED LANDING

G ACCIDENT LOCATION

OS Map No..... Grid Ref

H PERSONS ON BOARD CREWPASSENGERS

INJURIES	CREW	PASSENGERS	OTHERS
FATAL			
SERIOUS			
MINOR/NONE			

I NATURE OF THE EVENT

.....

.....

.....

DESCRIPTION OF THE ACCIDENT SITE

.....

.....

**PLEASE DO NOT DELAY NOTIFICATION IF SOME OF
 THE ABOVE INFORMATION IS NOT AVAILABLE**

Appendix D

Search and Rescue Procedures

Responsible Authority

As a Contracting State under the Convention on International Civil Aviation, the United Kingdom is committed to providing Search and Rescue (SAR) services for international civil aviation throughout defined areas on a 24 hour basis.

These areas consist of the UK overland area and adjacent sea areas to approximately midway to the European mainland to the east and to 030°W over the North Atlantic, excluding the Shannon Flight Information Region.

Responsibility for SAR for civil aircraft within the UK Search and Rescue Region (SRR) rests jointly with the Department for Transport (DfT) and the Ministry of Defence (MOD). The DfT is responsible for SAR policy for civil aviation. The MOD is responsible for the implementation of SAR services for civil aviation throughout the UK SRR.

This responsibility is discharged through: **The Aeronautical Rescue Co-ordination Centre (ARCC) at Kinloss - Telephone 01309-672161 Ext 6202**

The Rescue Organisation

When an Area Control Centre (ACC) has reason to believe that an aircraft is in a state of emergency, it will alert the ARCC and notify the local police, if appropriate.

1. The ARCC will alert SAR units and RAF Mountain Rescue Teams (MRT).
2. The Police will notify civilian MRT, fire, ambulance and hospital services.

At some places, arrangements are made for the ACC to notify the fire service directly.

Should the first report of an accident be given to the police by a member of the public, the police should alert fire and other services. The police should also advise the ACC of the rescue action being taken and give full details.

Area and Terminal Control Centres (ATCC)

Scottish ATCC - North of N55° (Carlisle / Newcastle)

01292 479800 Ext 2661 or 01292 479800 Ext 2763 or 01292-479800 Ext 2663

London ATCC - South of N55° (Carlisle / Newcastle)

01895 426003 or 01895 426422

When the location of a civil aircraft which has crashed on land is known, and no air search is necessary, the civil ground organisation (normally the police) will take responsibility for dealing with the incident. However, it is essential that both the ACC **and** the ARCC are informed to avoid duplication of effort and for expert consideration of any SAR back-up services which could be required.

(The above has been extracted from the SAR Section of the UK Aeronautical Information Publication).

Appendix E
Passenger Questionnaire

Passenger Questionnaire

The Air Accidents Investigation Branch (AAIB), part of the Department for Transport (DfT), is responsible for investigating serious aircraft accidents and incidents. The aim is to make flying safer by thorough investigation which includes gathering information from both the passengers and crew involved. It would therefore be appreciated if you would assist the investigation by completing as much of the following questionnaire as possible. Thank you.

Personal Details

Full name:

Address:

.....

.....

Telephone: (Home).....(Work).....(Mobile).....

Occupation: email:

Age: Gender: *Male / Female (Please delete as appropriate)*

Flight Details

Date: Flight No:

Airline: Aircraft type:

From: To:

Seat Position

Sitting in row number:..... seat letter: or *I do not remember my seat number*

Was this the seat given on your boarding card? *Yes / No*

<u>Class</u>	<u>Area of Cabin</u>	<u>Seat</u>	<u>Side</u>
<i>First / Business / Economy</i>	<i>Front / Centre / Rear</i>	<i>Aisle / Centre / Window</i>	<i>Left / Right / Centre</i>

Names of other persons travelling with you:.....

Was there a seat on your left: *Yes / No* Occupied: *Yes / No* By a: *Male / Female* Approx age:.....

Was there a seat on your right: *Yes / No* Occupied: *Yes / No* By a: *Male / Female* Approx age:.....

Description of Event

How and when did you realise something was wrong?

.....

.....

.....

Please give a brief account of what you heard and/or saw:

.....

.....

.....

Page 1 **Continued overleaf**

Appendix E (Cont)
Passenger Questionnaire

**Passenger
Questionnaire**



Leaving the Aircraft

Did you hear any announcements made by the crew of the aircraft? *Yes / No*

Were they clear? *Yes / No* Were you able to follow the instructions? *Yes / No*

Were any of the the following illuminated? *Cabin lights / Seat belt signs / Emergency exit lights / Floor level lighting*

Please indicate how you left the aircraft:

I left the aircraft by a: *Door / Over-wing exit / Break in cabin wall* using: *Steps / Escape slide / Other*

on the : *Left / Right*  *R* at the: *Front / Centre / Rear* of the aircraft

Please describe any difficulties encountered: (eg exit impeded, overhead bins falling open)

Injuries:

Please briefly describe any injuries you suffered and how they occurred:

Fire:

Please describe any fire or smoke:

General comments:

Is there anything else you feel would help our investigation? (eg did you take cabin baggage with you)

Thank you for helping with our investigation. Please give this questionnaire to an AAIB inspector, a police officer, or return it by post or email to the following address:

ISU, Air Accidents Investigation Branch, Farnborough House, Berkshire Copse Road; Aldershot, Hampshire, GU11 2HH
United Kingdom
email: enquiries@aaib.gov.uk

If you have any questions, or any points you wish to discuss please write to us at the above address or contact us by telephone on +44 (0) 1252 510300 or by fax on +44 (0) 1252 376999. More information on the AAIB is available on our web site at www.aaib.gov.uk, including a printable version of this form.

A report concerning this investigation will be published when the investigation is complete and will be available on our website.

Appendix F

Accident Site Hazards

Introduction

Aircraft accidents have the potential to expose responding personnel to a wide range of health and safety hazards. These hazards, generated by damage to aircraft structures, systems, components and aircraft contents, will be highly variable in nature and will be influenced by factors associated with the accident scenario, eg aircraft size and type, degree of damage, accident location, weather conditions, environment, security, etc. It is important therefore that responding personnel are aware of the hazards likely to be present at accident sites, and take the appropriate measures to assist in reducing the risks from exposure to such hazards.

The following, non-exhaustive, list provides details on generic hazards associated with aircraft accidents. Further information on hazards and assistance with determining risk in specific accidents, particularly during the early stages of response, can be sought by contacting the AAIB.

Flammable substances

Fuel is the primary hazard in almost all aircraft accidents:

Aviation gasoline (AVGAS) is used in piston engine aircraft,

Motor gasoline (MOGAS) is road vehicle petrol used in some aircraft engines,

Aviation turbine fuel (AVTUR) (kerosene) is used in jet or turbo-prop aircraft,

Diesel is also used, although currently not widely.

Fuels have different characteristics with varying flash points. However, all fuel types present hazards due to their flammability and constitute a significant risk in accident situations. Fuels can also present hazards through the inhalation of vapour and due to skin contact. Therefore, effective control measures should be established to reduce the risk of exposure through all these routes. Generally speaking, the larger the aircraft, the higher volume of fuel that can be carried.

Damaged structures

Accident damaged aircraft present a variety of hazards: sharp and jagged edges, unstable or weak structures, and retained energy (pressurised, or spring/cartridge assisted components).

Pressurised systems and containers

A variety of containers may be used to hold pressurised gases and fluids: hydraulic fluids, nitrogen, oxygen, air, fire extinguishing gases/fluids/powders, etc. Pressures can be up to several thousand psi./several hundred Bar. Sudden release of these substances can pose hazards in terms of impact, absorption, inhalation and fire.

Appendix F (Cont) Accident Site Hazards

Cargo

Cargo can vary in volume and variety and will be identified as Dangerous Goods or non-hazardous. However, irrespective of classification, all cargo subjected to the effects of fire and impact in aircraft accidents can be harmful to responding personnel and to the environment. In cargo aircraft accidents it is important for all agencies to co-ordinate efforts to identify cargo and determine the hazards as early as possible.

(Note: Many large passenger aircraft also carry significant amounts of cargo.)

Blood-borne pathogens

The variety and nature of blood-borne pathogens is likely to be one of the more well researched hazards associated with transport accidents. Aircraft accidents present different challenges due to the potential for a large numbers of casualties. In addition, 'high-speed impact' accidents can generate traumatic damage to casualties that presents significant difficulties in the identification and recovery of victims. In this situation, response and recovery teams, working with the AAIB, need to establish good systems of work to reduce the potential exposure to blood-borne pathogens.

Aircraft escape systems

Military aircraft and some ex-military aircraft may have ejector seats, explosive canopy release systems, and equipment jettison systems. All of which can present significant risk of injury to responding personnel. Extreme care should be exercised when attempting to rescue personnel from these aircraft, and wherever possible, the advice and assistance of trained personnel should be obtained before attempting to do so.

For military aircraft, the nearest MoD establishment will be able to direct suitably trained personnel to the site to make the systems safe.

For ex-military aircraft, the AAIB will be able to contact suitably trained personnel to assist response personnel.

Weapon systems

Military aircraft should be suspected of carrying some form of military pyrotechnics or weapons until confirmed otherwise. The nearest MoD establishment will quickly be able to get confirmation of the carriage of any weaponry and will be able to direct suitably trained personnel to the accident site to assist.

Cartridge initiated devices

Aircraft may carry a variety of cartridge initiated devices for rapid activation of certain systems. These cartridges produce a small volume of gas to release other gases, or operate mechanical systems. These are often used for fire extinguisher systems, escape slides, winch and under-slung load cable cutters, and flotation gear. The unexpected operation of these cartridges is unlikely to pose any significant hazard. However, the unexpected activation of the devices they operate can present some hazards through impact or exposure to released gases.

Appendix F (Cont) Accident Site Hazards

Pyrotechnics

Pyrotechnics may be carried by aircraft in the form of signal flares or smoke generation devices. These are likely to be associated with emergency equipment such as life-rafts or dinghys. Some light aircraft can also be fitted with a rocket-activated ballistic recovery parachute system.

Fire & impact damaged materials

Many of the materials used in aircraft construction can produce harmful gases, vapour and particulates when subjected to the extreme effects of air accidents.

Aluminium - used in aircraft structures.

Magnesium - used in components such as wheels and gearboxes.

Other metals and alloys - used in engines and systems.

Composite materials (carbon, glass, and other fibres in a resin matrix) - used in major parts of the structure in more modern aircraft. When burnt or impact damaged these often produce free fibres which are highly irritant.

Control measures for all burnt materials should include limiting exposure, suppression of particulate with water or fluids, and where required, the use of Personal Protective Equipment (PPE).

Electrical systems

Electrical batteries and emergency power supplies present hazards due to their electrical potential, because of their chemical content, and due to heat and fire caused should an internal short circuit occur. Systems should be isolated as early as possible.

