

Guidance for An Garda Síochána and the Emergency Services in the aftermath of an Aircraft Accident

Produced by the Air Accident Investigation Unit



Department of Transport
An Roinn Iompair



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IRISH MILITARY AVIATION ACCIDENTS

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Guidance for An Garda Síochána and the Emergency Services in the aftermath of an Aircraft Accident

1. Foreword

Usually, the Emergency Services and An Garda Síochána are the first trained personnel to arrive at an aircraft accident site. The first persons arriving at an aircraft accident site 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 prevent loss of clues and evidence as to the factors that contributed to the accident. This booklet has been prepared by the Air Accident Investigation Unit (AAIU) of the Department of Transport to assist these personnel in better understanding the essential procedures that need to be followed in the aftermath of an aircraft accident, as well as the many hazards that may exist at aircraft accident sites, in particular military accident sites.

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

- Accident Occurs.
- Emergency Services respond.
- Accident Reported to AAIU (by Air Traffic Control, An Garda Síochána, the Pilot/Operator or an eye witness).
- AAIU Go-team dispatched.
- Priority action by An Garda Síochána to secure accident site when Emergency Services have completed their task.
- AAIU Team arrive, and after site briefing from the Garda/member in charge, commence initial investigation, including recording of site through photography, retrieval of flight recorders and witness statements.
- AAIU continue investigation and develop a Report for publication.

TO REPORT AN AVIATION ACCIDENT/SERIOUS INCIDENT

To Air Accident Investigation Unit (AAIU)

Telephone: 01-6041293 (24 Hours a Day)
01-2411777 (24 Hours a Day)

Note: During normal working hours the above telephone numbers will be answered by personnel from the AAIU. Outside of normal working hours these telephone numbers will automatically be diverted to the Inspector of Accidents-on-Call (IOC)

2. Role Of The AAIU

Under current legislation and in conformity with International Convention, the AAIU is the body responsible in Ireland for the investigation of aviation 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, and Statutory Instrument No. 205 of 1997, Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 1997. The fundamental purpose of such investigations is to determine the circumstances and causes of these events, with a view to the preservation of life and the avoidance of similar occurrences in the future. It is not the purpose of such investigations and their associated Reports to apportion blame or liability.

The AAIU is an operationally independent unit within the Department of Transport and is functionally separate from the Irish Aviation Authority (IAA), which is the Regulatory Authority and aviation service provider for the State. The AAIU has its head office at Transport House, 44 Kildare Street, Dublin 2.

3. What Is An Aviation Accident/Serious Incident?

The full definitions of an accident and serious incident are contained in the AAIU Regulations covered under Section 3, Part 1 of S.I. 205 of 1997, Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 1997, the relevant extracts of which are shown as Appendix A.

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

4. Who Must Report An Aviation Accident?

The legal responsibility for notification of an accident or serious incident rests first with the commander of the aircraft or, if he/she is killed or incapacitated, then the Operator. In practice, first information usually reaches the AAIU from Air Traffic Control (ATC), an Airport Authority, the Gardaí dealing with the accident, the Pilot, or a member of the public. Anyone learning of an aviation accident or serious incident should, in addition to alerting the Gardaí and the Emergency Services, report the accident to the AAIU as soon as possible.

5. What The AAIU Need To Know

Accurate information provided to the AAIU, will help to identify the aircraft type/location and put in place an appropriate response. So please immediately report the following details where possible:

- (a) Aircraft type and its registration letters/numbers

Civil. For Irish civil aircraft, the registration begins with the letters EI followed by three additional letters (example EI-ABC). If no EI 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 either side of the fuselage (main body), the tail fin/rudder combination and the wings.

Military. For Irish military aircraft, the registration is made up of three numbers (example 277) on either side of the fuselage. In addition, the aircraft's serial number, tri-colour as well as some form of squadron or unit identification may be found on the wings and the tail fin/rudder combination.



Foreign Civil Aircraft. It is difficult to predict how a foreign civil aircraft may be identified, as some countries use five letter codes e.g. (G-BXTO) and others use a mixture of letters and numbers e.g. (N803DE). The countries national flag is generally located on the tail fin.

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 countries national flag located either on the wings or on the tail fin/rudder combination.

- (b) Name of the owner or operator, or military operating unit.
- (c) Names of the pilot/crew and any other people on board (name, rank, and serial number for military).
- (d) Date and time of the accident.
- (e) Aircraft's last departure point and its destination.
- (f) Location of the accident, including directions on how to reach the scene.
- (g) Extent of any personal injuries to the occupant(s) or others.
- (h) Nature of the accident i.e. Phase of flight (e.g. Take-off, landing etc, mission, and description of occurrence.
- (i) Extent of damage to the aircraft.

A specimen Notification FAX is shown at **Appendix B**. Notification should not be delayed even though all the information is not yet available.

6. Obligation To Investigate An Aviation Accident/Serious Incident

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

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

The extent of investigations and the procedures to be followed in carrying them out shall be determined by the Chief Inspector of Accidents, taking into account the principles and the objective of the Directive and depending on the lessons the Chief Inspector may expect to draw from the occurrence for the improvement of aviation safety. Regulations pertaining to the investigation of Accidents and Serious Incidents to **State Aircraft** are presented as **Appendix A**, (Definitions)

7. AAIU Response

The actual location and circumstances of the accident/serious incident and whether it is a civilian or military aircraft will determine the type of response.

In practice, Notification is normally passed to the AAIU Chief Inspector of Accidents who will decide on what action to take. On average, there are more than 80 accidents/serious incidents reported to the AAIU each year, but fortunately, the majority of these are relatively minor and will usually be investigated by correspondence and telephone.

For accidents or for a more significant serious incident, a team of AAIU Inspectors will be dispatched to carry out a Field Investigation. Their time of arrival will be dependent on the distance they have to travel. There will sometimes be a period of several hours after the initial notification before the Inspectors can reach the scene. In some remote areas, it could be the next day before they arrive. It is most important that the site is kept secure by An Gardaí, pending the arrival of the AAIU Inspectors and until the wreckage can be removed to a secure AAIU location. The Inspectors have the powers to require evidence to be produced and to retain it.

8. Fire Fighting

It is vital that the fire is extinguished as soon as possible and, as soon as all has been done to save life and minimise injury, that the wreckage should be disturbed as little as possible. It is important that the Fire Service does not allow the post-impact fire to burn itself out as this will cause unnecessary damage to the wreckage and will destroy evidence.

9. Site Security

All aircraft accident sites outside of military airfields/bases should be initially secured by An Garda Síochána to prevent unauthorised persons from entering the area. There may also be a requirement to maintain a security presence during the on-going examination of the accident site.

The prevention of unauthorised persons entering an accident site is based on; respect for casualties, protection of valuables, important or classified equipment, the preservation of evidence to establish the factors that contributed to the accident, and the prevention of unnecessary exposure to hazards. In essence, the accident site should be initially treated as a crime scene and secured accordingly.

THE IMPORTANT MESSAGE TO IMPART IS THAT, AFTER THE INITIAL EMERGENCY RESPONSE PHASE, THE ACCIDENT SITE SHOULD BE DISTURBED AS LITTLE AS POSSIBLE, UNTIL THE ARRIVAL OF THE AIR ACCIDENT INVESTIGATION TEAMS.



10. Accident Site Safety

In common with all disaster and accident sites, the safety of the Gardaí, Fire Fighting and Rescue Personnel remains paramount. An aircraft site would be no different, however it may contain specific threats to safety which are outlined in subsequent chapters of this document. Overall responsibility for safety at the site will reside with the Local or appropriate authority, depending on the location and severity of the accident. However, organisations working at the site will retain responsibility for the safety of their own personnel and others working under their direction while using their own lay down procedures. 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 may have to be formed to assist with the safety management process. Initiation and chair of the group is likely to be co-ordinated by the Local Authority emergency planners. Group members should include safety co-ordinators from the main organisations involved, including the AAIU, Military Authorities, An Garda Síochána, Fire Service, Ambulance Service, Civil Defence, Emergency Planners, Environmental Protection Agency and contractors, etc.

A retained or permanent fire brigade service may be the first emergency service to arrive at an aircraft accident site. Where the accident occurs in close proximity to a military airfield/base or civilian airport, it is possible that a Defence Forces fire brigade unit or an airport rescue fire fighting service (ARFFS) may also respond. Both these resources will have specialized personnel and specific equipment onboard to deal with aviation accidents.

A key consideration at accident sites is that rescue personnel do not themselves become a casualty. In the heat of the moment and the desire to alleviate suffering and minimise

casualties, individuals sometimes place themselves at considerable personal risk of injury or even death. Military aircraft, in particular, need to have hazards such as weapons, ejection seats or pyrotechnics neutralized prior to persons entering the accident site. Cautious haste and an awareness of the hazards at aircraft accident sites will better prepare you for the tasks at hand.

Upon completion of the fire fighting and rescue phase, the AAIU will normally assume responsibility for investigation and recovery operations at the site (**See Section 21 Coordinating with An Garda Síochána**). AAIU personnel will undertake an assessment of safety hazards posed by the aircraft wreckage and cargo. The advice of the senior Fire and Garda Officers will be sought to establish information on hazards previously identified. Specialist personnel may be employed to assist with the assessment process, in particular, in relation to buildings and other structures at the site. 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 or visiting the site. Control measures are likely to include limiting access to all or specific site areas, the use of protective clothing, restriction of both ground and air traffic movement, and may also include the operation of an entry pass system.

Some accidents 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, in particular the Emergency Planning department, is essential for the effective co-ordination and non-investigation activities at and around major accident sites. The AAIU will seek to maintain a close liaison with the Local Authorities to provide advice and assistance where required.





11. Dangerous Materials

Damage to modern aircraft can result in release of dangerous materials at an accident site, e.g.:

- Airborne synthetic products similar in nature to asbestos fibres;
- Toxic materials that may inadvertently be inhaled or affect the skin;
- Potentially explosive devices such as oxygen bottles, high-pressure tyres, hydraulic accumulators and, for military aircraft, rocket-powered or explosive cartridge-powered ejection seats, pyrotechnics and unexploded high explosive ordnance stores;
- Pathogenic (body) products; and
- Radioactive materials.

Only those personnel essential to perform immediate actions to extricate survivors, the protection of the wreckage from destruction by fire or other causes, the prevention of damage to other transport or danger to the public, should enter an accident site.

Aerospace vehicles may also be involved in an accident on Irish Soil. These vehicles may vent dangerous gasses for some time after landing and contain unfired retro-rockets. Such a vehicle may also contain a nuclear power source. For detailed information on accident site hazards see

Appendix C.

12. Organisation Of The Investigation

Modern aircraft systems are complex and there is an ever-present risk of destroying vital evidence as a result of an inadvertent action by members of the Emergency Services.

With the increasing complexity of the aviation environment, e.g. flight operations, aircraft systems, and air traffic control, it has become necessary for investigative teams 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 and equipment, or other government agencies. They will be formed into working groups under the direction of the AAIU. The number and scope of the groups depends on the site and the complexity of the specific accident.

An Investigator-in-Charge (IIC) will be appointed by the Chief Inspector of Air Accidents and will be responsible for the overall conduct and control of the accident investigation. The IIC will decide on which specialist working groups are required and will co-ordinate and direct the efforts of the groups. The IIC will also ensure that regular liaison is maintained between the AAIU and An Garda Síochána, the Emergency Services, the Local Authority and the Coroner.

13. Custody And Protection Of Aircraft Wreckage

The AAIU recognise that the Garda Síochána and Emergency Services personnel have a duty to take action immediately on arrival on the scene. However, in determining the factors that contributed to the accident, it is important (where possible) to disturb a site as little as possible.

Do not allow anyone to unnecessarily disturb the aircraft wreckage or any ground marks made by the aircraft at the accident site. Any aircraft involved in an accident remains in the custody of An Garda Síochána until the arrival of the AAIU and/or the Military Authorities. In accordance with SI No.205 of 1997 Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 1997, Part II, Section 12. A person shall not remove or otherwise interfere with the aircraft, a part of the aircraft, the contents of the aircraft, or the site or object, unless prior permission has been granted by the AAIU, or except in consideration of the following:

- (a) the aircraft or any part of the aircraft may be removed or interfered with so far as may be necessary for the purpose of extricating persons or animals from the aircraft, removing any mail carried by the aircraft, preventing destruction by fire or any other cause, or preventing any danger or obstruction to the public or to air navigation or to other means of transport,
- (b) goods or passengers' baggage may, if released by a person from the AAIU or military authority as not being required as evidence, be removed from the aircraft under the supervision of a member of the Garda Síochána, but in the case of an aircraft which has come directly from a place outside the State, shall not be removed from an aircraft, or the vicinity of the aircraft, except with the consent of an officer of Customs and Excise,

- (c) the aircraft or any of its parts or contents, if lying in a position of danger to life or property or to the aircraft, part or contents, or if wrecked in water, may be moved to such extent as may be necessary for bringing it or them to a place of safety, and
- (d) where it is necessary to disturb or move aircraft wreckage, or any mail or cargo in the aircraft or wreckage, the person supervising the disturbance or movement shall, whenever possible, take measures (which may include the preparation of descriptive notes, the taking of accurate measurements, the making of sketches and the taking of photographs and video recordings) to record the original scene, and the position and condition of the wreckage and of any significant impact marks. Coverage should include an overview of the site and close-up of the wreckage, especially the cockpit area, and of the bodies.

DO NOT TRY TO RESTORE THE WRECKAGE TO ITS ORIGINAL STATE UNLESS THE AAIU ASK YOU TO DO SO.

Runway debris. In case of accidents or serious incidents occurring at airports there may be debris scattered along the runways or taxiways, which needs to be mapped. There is often considerable pressure to sweep paved areas to allow operations to continue and the AAIU has no wish to cause unnecessary delays. In such circumstances the AAIU guidance is that, after obtaining the AAIU's agreement, the initial clearance of debris should be to the edge of the paved area and the distribution of these items recorded. This will help investigators to reconstruct the failure sequence.



An Garda Síochána should also consider the following:

- Secure the accident site by placing a cordon around all scattered wreckage as well as other evidence such as ground scars/marks made by the aircraft.
- Carefully record, as soon as possible, the positions in the aircraft wreckage from which any survivors of the accident were assisted. It helps injury prevention research if deceased person(s) remain in their original place until a pathologist can examine them. If this procedure is likely to distress the public or relatives of the deceased persons, the bodies may be removed. If you must remove a body before the Coroner/Pathologist arrives, carefully record its position and posture and attach the record to the body. Please note that for the benefit of the AAIU or the Military Authorities, it is not essential to the investigation for bodies to be left in-situ, once they have been properly recorded.
- Take some photographs, recordings or sketches if items/evidence are considered likely to be obliterated or lost prior to the arrival of the investigation teams.
- 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.
- Prevent interference with rescue and associated operations;
- Admit only authorised personnel to the accident site; and
- Keep bystanders outside the established zone of safety.

Photographs and videos. In inclement weather, protection of vital areas such as the cockpit, lighter pieces of wreckage and ground scars may be preserved by covering with a tarpaulin. Should coverings not be available, photography and videoing of the scene would assist the investigative team greatly. The cooperation of a local photographer or news media photographers should be considered for the recording of perishable evidence that could be lost prior to the arrival of the investigative teams.

Where the accident occurs during nighttime hours, it is likely that the examination of the wreckage will be postponed until first light. In this event, on-going security of the site will have to be provided by An Gardaí. Use of the Defence Forces and/or the Civil Defence should also be considered.

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

14. Rescue Of Personnel From Crashed Aircraft

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

Without unnecessarily endangering yourself, rescue and care of survivors is the first priority at an aircraft accident site. If survivors appear to be in the aircraft and rescue seems possible, consider the following:

- Use care in approaching wreckage by vehicle, particularly if the approach is along the crash path, as survivors may have ejected or been ejected from the aircraft. Alternatively, if you are the first on the scene you may find no one else present. Several possibilities exist, the occupants may have parachuted to safety, may have survived and left the scene to seek assistance or have been consumed in the wreckage
- Approach the site from upwind (with the wind at your back) and downhill if possible to avoid inhalation of burning materials, some of which may be toxic, others of which can be very irritating to the breathing tract.
- Look around the crash path, and maintain a clear observation of the accident site and associated hazards
- In general, information related to access, rescue and how to open doors and canopies, will usually be printed in red or black and yellow print on the aircraft.
- Blood borne pathogens, smoke, dust and composite fibre splinters may be present at accident sites particularly where injury or burning has taken place. Wear appropriate Personal Protection Equipment (PPE) to prevent against risk of infection or injury
- 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 should be able to provide details of number of persons onboard. 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. Consider shelter in-place for casualties as an alternative if accident site environment poses potential hazards
- If there is evidence of a spreading post-accident fire or possible explosion from fuels or armaments, move survivors a safe distance from the scene. If survivors require immediate evacuation to medical facilities, they should be decontaminated of hazardous materials prior to being removed if possible. For example, military aircrew life vests contain explosives and hazardous materials. They should be stowed in a safe location at the accident site



STAY CLEAR FROM WING-MOUNTED TANKS, ARMAMENT PODS, UNDERCARRIAGE LEGS, TYRES AND PRESSURE VESSELS (gas bottles).

These assemblies can explode with devastating violence, particularly if fire has occurred. DO NOT disturb armament thrown clear from aircraft.



Some military aircraft may have EJECTION SEATS fitted. The Irish Air Corps turbo-prop PC9/A trainer has TWO ejection seats fitted in each aircraft. These aircraft also have an in-built explosive system for emergency jettisoning of canopies. 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. The "MAKING SAFE" of ejection seats is best left to trained personnel. However, if an urgent requirement exists to unstrap and remove survivors from an aircraft, use utmost care and avoid interfering with items (straps, pull handles etc), which are generally colour coded with yellow and black stripes. For more detailed information on this subject see **Appendix D**

Military aircraft may also have armaments onboard, while Search and Rescue (SAR) aircraft/helicopters carry a variety of pyrotechnics.

The "MAKING SAFE" and removal of these items must be left to trained personnel.

For the purpose of rescue, the location of access doors, hatches, break-in points and cut-out panels are generally indicated on the external surfaces of military aircraft by a yellow arrow, bordered black. 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 needs to be exercised to avoid cutting devices igniting spilled fuel.

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



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. Where a first-aid kit is carried, its marking will be found adjacent to an access panel or exit from which the kit is accessible.



To minimise risk of fire or further fires, establish a NO-SMOKING zone around the accident site. Volatile/flammable materials may have been scattered over a wide area. If evacuation from homes in the accident area is necessary, make every effort to do so without undue alarm; panic can cause unnecessary injury to innocent parties.

14



To prevent the inadvertent ingestion of harmful materials, including biological hazards, establish a NO-EATING zone around the accident site.

KEEP BYSTANDERS WELL CLEAR OF THE ACCIDENT SITE AND WRECKAGE

15. Flight Recorders

Flight Data Recorders (FDR) and Cockpit Voice Recorders (CVR), commonly referred to as “Black Boxes”, can provide vital information to the investigation on the final moments of the flight. The recorders (Boxes) are in fact coloured an orange ‘Dayglow’ and while these boxes are virtually indestructible, the data contained therein can be corrupted or even lost, unless the boxes are removed by trained personnel. If flight recorders are found at the accident site, the immediate vicinity must be secured and the find reported to the air accident investigation team.



Two examples of flight recorders

UNDER NO CIRCUMSTANCES SHOULD THE RECORDERS BE INTERFERED WITH BY PERSONS OTHER THAN THE AIR ACCIDENT INVESTIGATION TEAM.



16. Documentation

A large number of documents and papers maybe carried by aircraft, and the recovery and (know as the Aircraft Library) preservation of this material is vital. Any papers associated with an aircraft accident that are found in close proximity to the accident site should be carefully collected and held, with a minimum of handling of damaged or burnt specimens. If the flight deck/cockpit of a public transport aircraft remains intact, access should be prevented and documents not removed unless there is a risk of their loss or damage.

The documents carried often include, the Certificate of Airworthiness, Certificate of Registration, Certificate of Maintenance, Technical Log, Load and Balance Sheets, Aircraft and Operations Manuals, maps, notes, etc. Examination of such documents and analysis of the information contained in them may provide vital evidence for investigators.

17. Eyewitnesses To Accident

Eyewitnesses are extremely important in helping determine the factors that contributed to the accident. The names, addresses and contact details of witnesses should be noted by An Garda and the list passed to an AAIU Inspector on their arrival at the accident site.

Preliminary eyewitness statements detailing first reactions can be of considerable value to investigations. Such statements will be untainted by reflection, rumour or exposure to the news media.

Witness statements should include, where possible:

- Names, addresses and contact details;
- Position from which the eyewitness observed the event;
- Time of accident;
- Weather conditions at time of accident;
- Direction aircraft was heading or coming from and what it appeared to be doing;
- Estimate of aircraft's height (estimate of angle above surrounding terrain from observer's position using trees and buildings as a reference where possible);
- Was aircraft on fire in flight?
- What sounds were heard?
- What was the impact angle of the aircraft?
- Did any objects fall from the aircraft prior to impact?
- If objects did fall from the aircraft, what was the flight path of the aircraft at the time (level, climbing, diving)?
- Were any photographs/video recordings taken of the accident sequence?

A standard AAIU witness statement form is presented as **Appendix E**

18. Post Mortem - Aviation Pathology

An Garda Síochána on behalf of the State or County Coroner have jurisdiction on all fatalities in Ireland. Emergency Services personnel and other authorities work closely together with An Garda Síochána and the Coroner.

Fatalities should not be moved without agreement from an Inspector of Air Accidents and/or until a specialist doctor (or other competent medical authority with aviation medical experience) has examined them and should only be moved under Garda supervision. On no account should clothing or safety equipment be removed from fatalities before specialist medical examination and recording.

A suitable decontamination procedure should be arranged by the site controller, if deemed necessary by the agencies involved in the rescue and the recovery and in agreement with the Investigating Authority. Human remains are to be handled and transported in accordance with standard coroner procedures.

All crew and passengers fatally injured in a civil or military aircraft accident in Ireland are subject to a post-mortem examination by the Coroner.

Whilst the cause of death following an aircraft accident is generally obvious in the broad sense, the standard autopsy report may not meet the requirements of the aircraft accident investigation. In general terms, the following information would be required by the AAIU:

- (a) Evidence of cause of the accident:
 - (i) Mechanical failure in the aircraft (from body injury evidence).
 - (ii) **Physical.** Who was controlling the aircraft? Was there disease, which could have influenced the function of the crew or incapacitated them?
 - (iii) **Toxicological.** Were the crew affected by noxious fumes, drugs, or alcohol?
 - (iv) **Physiological.** Was there a defect in the pressurisation system?

- (v) Evidence of injury by pre-impact explosion or fire.

- (vi) Location of victims in aircraft.

- (b) Evidence of sequence of events of the accident.

- (c) Was the accident anticipated or not?

- (d) Evidence as to survivability.

In the case of an accident to a large passenger aircraft, problems associated with the identification of multiple casualties are introduced. The identification of casualties is not an end in itself, but must be regarded as part of the whole investigation.

19. Disposal Of Wreckage

Depending on the circumstances of the accident, the wreckage:

- (a) may be removed by the AAIU for examination at a pre-assigned facility, or

- (b) released at the accident site by the AAIU to its owners.

In any event, aircraft wreckage preserved by an AAIU Inspector for the purpose of investigation or public inquiry may be disposed of to its owners, or their authorised representatives, on completion of the associated proceedings, or at such time as is considered appropriate by the inspector.



20. 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 AAIU or military authorities, for their own safety, they must remain outside the secured area. The AAIU realise the media have deadlines to meet and will seek, with An Garda Síochána, to provide access to an accident site as soon as it is practicable.

Although the media need to be provided with accurate and timely information, they must also comply with the law when collecting that information and ensure that their work does not affect the health and safety of others. Misleading information can cause great distress to families and friends of those involved in an accident. Photography by the media of survivors or deceased persons should not be permitted.

Use of mobile telephones/Radios. Care should be exercised in the use of mobile telephones or radios, as the media may be capable of monitoring communication frequencies.

The news media are to be prevented from flying over or hovering over the accident site. A restricted zone above and around the site will normally be declared and promulgated to pilots by means of a 'Notice to Airman' – NOTAM. This can be arranged through the Irish Aviation Authority (IAA) – **(Phone 01-6718655)**

The Chief Inspector of Air Accidents may release information arising from a civil aviation accident investigation. The Secretary General of the Department of Transport has authorised AAIU Inspectors to answer media questions in factual terms at the accident scene during the early part of an investigation. Later releases of information relevant to the AAIU investigation must be cleared by the Department of Transport/AAIU Press Office. An Garda Síochána or other organisations should confine their comments to the conduct of their own work and follow the advice of their own media departments.

The AAIU 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 next-of-kin have been informed and will often use the Garda Síochána as his agents. Speculation as to the cause of the accident should be avoided at all costs.

21. Co-operating With An Garda Síochána Inquiries

If an aircraft accident investigation involves other Garda Síochána inquiries (e.g., for the information of a coroner or a criminal investigation), the AAIU's Inspectors will assist where possible, within the constraints of the legislation, provided this does not compromise their own investigation. If early evidence suggests the accident was the result of some criminal act, An Garda Síochána would normally direct the investigation and the AAIU would not investigate. The AAIU would then provide technical assistance on request.

Evidence collected by an AAIU Investigator as part of an air safety investigation is usually not collected in a form readily usable in a court of law. AAIU Investigators, for example, do not take formal statements from witnesses under the rules of evidence. Air safety records attract substantial protection under the Air Navigation Act. This is because, in the interest of future safety, the AAIU requires ready access to all evidence and if used for the purposes of blame, or to determine a liability, such information or evidence may not be so fully available. Organisations that may wish to ascribe blame or liability must undertake their own separate investigation.

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IRISH MILITARY AVIATION ACCIDENTS

22. Role Of The Irish Air Corps

All Irish military aircraft are the property of the Minister of Defence. The General Officer Commanding (GOC) the Irish Air Corps, pursuant to the Defence Act (1954), regulates the operation and maintenance of service aircraft. The Minister of Defence has established the office of the Air Corps Flight Safety Officer, whose responsibilities are defined in Air Corps Flying Orders. These orders task the Air Corps Flight Safety Officer and the Chief Aeronautical Officer of the Military Airworthiness Authority, with the investigation of service aircraft accidents and incidents.

The military aviation safety investigation investigates using a 'no blame' culture the sole purpose of which is to identify the cause(s) so as to prevent or reduce the potential for re-occurrences. The Air Corps Flight Safety Office and the Military Airworthiness Authority have staff trained in the investigation of aircraft accidents and incidents.

These personnel will normally be appointed by GOC Air Corps to form an Accident Investigation Team (AAIT) when an accident or incident occurs. The Irish Air Corps AAIT personnel will normally be the first Air Corps personnel to arrive at the scene.



23. What Is A Military Accident/Serious Incident?

A military aircraft accident is covered under Air Corps Flying Orders and Regulations.

A military aircraft accident is an event occurring within the period of operation of the aircraft which results in loss of an aircraft, damage to or structural failure of an aircraft which adversely affects the structural strength, performance or flying characteristics of the aircraft, and requires major repair of the affected airframe component, or death of, very serious or serious injury to any person who was an occupant of the aircraft, or came into direct contact with either the aircraft, detached parts of the aircraft or stores released from the aircraft.

24. Who Must Report A Military Aviation Accident?

Irish Air Corps Flying Orders require the Aircraft Commander and the Operating unit to report accidents and serious incidents immediately to Chief of Air Staff (Operations) and the GOC. Should any person witness an aircraft accident and there is reason to suspect that an Irish Air Corps aircraft has been involved, they should contact the Irish Air Corps as soon as possible.

TO REPORT A MILITARY AVIATION ACCIDENT

To the Irish Air Corps

Telephone: 01/4592493 (24 hours a day)

Note: Contact the Irish Air Corps Operations Headquarters at Casement Aerodrome, Baldonnel, Co. Dublin, or the Air Corps Duty Officer who is available outside normal working hours, at the same location. The Air Corps HQ will then activate an emergency response plan.

25. Irish Air Corps Response

On receipt of notification of a military aviation accident/serious incident the Irish Air Corps will immediately dispatch an Accident Investigation Team (AAIT).

26. Disposal Of Wreckage

The Irish Air Corps has responsibility for military aircraft crash site mapping, and the OIC AAIT will ensure adequate mapping is completed to satisfy the Military Authorities, the Coroner and other agencies. After the on-site investigation has been completed, recovery and salvage of the aircraft, with associated costs remains the responsibility of the Irish Air Corps. The OIC AAIT and operating unit will initiate recovery and salvage action.

27. Foreign Military Aircraft

Investigation of accidents of Foreign Military Aircraft will be conducted in accordance with SI No.205 of 1997 Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 1997, Part IV, Section 27.

Appendix A

DEFINITIONS CONTAINED IN STATUTORY INSTRUMENTS S.I. NO. 205 OF 1997 AIR NAVIGATION (NOTIFICATION AND INVESTIGATION OF ACCIDENTS AND INCIDENTS) REGULATIONS, 1997.

Relevant definitions in the Regulations are:

Accident means any occurrence associated with the operation of the aircraft, which takes place from 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 is fatally or seriously injured as a result of –
 - (i) being in the aircraft,
 - (ii) direct contact with any part of the aircraft, including a part which has become detached from the aircraft, or
 - (iii) direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew,

- (b) the aircraft sustains damage or structural failure which –
 - (i) adversely affects the structural strength, performance, or flight characteristics of the aircraft,
 - (ii) 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 from damage limited to the propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin, or

the aircraft is missing or is completely inaccessible:

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

Serious injury means an injury 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 laceration which causes 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 or injurious substances or injurious radiation;

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



Appendix A

List of Examples of Serious Incidents

The incidents listed below are typical examples of serious incidents. The list is not exhaustive and only serves as a guide to the definition of 'serious incident'.

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

Incident means an occurrence, other than an accident, associated with the operation of an aircraft, which affects or is likely to threaten the safety of the aircraft or its operation;

Appendix A

State Aircraft

27. (1) Where—

- (a) a state aircraft is involved in an occurrence arising out of or in the course of air navigation and occurring in or over the State, or
- (b) an aircraft belonging to the State, is involved in an occurrence anywhere,
 - and the Minister for Transport and the Minister for Defence, jointly, are of the opinion that—
 - (i) the occurrence was or may have been the result of a collision between that aircraft and a civil aircraft,
 - (ii) the occurrence occurred or may have occurred while the aircraft was on, or in the course of taking off from or landing on, an aerodrome used wholly or mainly for the purposes of civil aviation, or
 - (iii) the occurrence has or may have otherwise occurred in such circumstances that the Minister is or may be concerned or interested in its circumstances or causes,

they may direct that the occurrence shall be treated as an occurrence to which these Regulations apply and these Regulations, with the necessary modifications, shall apply accordingly.

- (2) Where a civil aircraft is involved in an accident or serious incident arising out of or in the course of air navigation and occurring in or over the State or, if the aircraft is registered in the State or belongs to the State, occurring anywhere, and the Minister and the Minister for Defence, jointly, are of the opinion that—

- (a) the occurrence was or may have been the result of a collision between that aircraft and a state aircraft.
- (b) the occurrence occurred or may have occurred while the aircraft was on, or in the course of taking off from or landing on, an aerodrome controlled by the Minister for Defence or by any authority responsible for the operation of state aircraft by any country, or
- (c) the occurrence has or may have otherwise occurred in such circumstances that the Minister for Defence or any authority or the operator of state aircraft of any state, is or may be concerned or interested in its circumstances or causes,

they may direct that the occurrence shall be treated as an occurrence to which these Regulations apply and these Regulations, with the necessary modifications, shall apply accordingly.

- (3) If it appears to the investigator in charge that the investigation of any occurrence involving state aircraft or facilities has been completed but for the investigation of matters affecting the discipline or the internal administration of the operator of the state aircraft or facility which are more appropriate for the investigation by some other person or body, the investigation may be treated for the purposes of these Regulations as if it had been completed without such matters being investigated under these Regulations. In such a case the report of the investigation into the occurrence shall state those matters to which the investigation has not been extended by reason of this paragraph.



Appendix B

AIRCRAFT ACCIDENT OR SERIOUS INCIDENT INITIAL NOTIFICATION

TO: AIR ACCIDENT INVESTIGATION UNIT
FAX: 353-1-604 1514

FROM: _____
ORGANISATION: _____
TEL: _____ **FAX:** _____ **E-MAIL:** _____

A. ACCIDENT _____ INCIDENT: _____ REF NO: _____

B. AIRCRAFT MANUFACTURER: _____ MODEL: _____
 NATIONALITY: _____ REGISTRATION: _____
 SERIAL NO: _____

C. OWNER: _____ TEL: _____
 OPERATOR: _____ TEL: _____

D. PILOT IN COMMAND: _____
 ADDRESS: _____
 _____ TEL: _____

E. DATE & TIME OF EVENT: _____

F. LAST POINT OF DEPARTURE: _____
 POINT OF INTENDED LANDING: _____

G. ACCIDENT LOCATION: _____
 GRID REFERENCE: _____

H. PERSONS ON BOARD: _____ CREW: _____ PASSENGERS: _____

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	_____	_____	_____
SERIOUS	_____	_____	_____
MINOR/NONE	_____	_____	_____

I. NATURE OF EVENT & EXTENT OF DAMAGE: _____

A BRIEF DESCRIPTION OF THE ACCIDENT SITE: _____

NOTE: PLEASE DO NOT DELAY NOTIFICATION IF SOME OF THE ABOVE INFORMATION IS NOT YET AVAILABLE

NAME: _____ DATE/TIME: _____
 SIGNATURE: _____

Appendix C

EXPLOSIVE HAZARDS

Fire Hazards

Materials used in aircraft construction, if subjected to intense heat, can produce hazardous situations or develop toxic side effects

Magnesium and aluminium metals in various mixtures are used extensively as structural components, particularly where lightweight framing is used. In some aircraft, magnesium is used in wheel assemblies. It is also used in pyrotechnics and burns with intense heat and radiates powerful light. Water should not be applied as an extinguishing agent to burning magnesium as an explosion may occur. Other hazardous metals such as Cadmium, Depleted Uranium, and Beryllium, are used in small quantities and can be extremely toxic when exposed to fire.

Composite materials (such as carbon fibre in an epoxy resin) are used extensively in modern aircraft. When involved in a fire, these materials may give off toxic fumes and loose fibres may be released in the smoke plume. It is possible, but not highly probable, that loose fibres may cause short-circuiting of electronics and electrical equipment. The major hazard, however, is from inhalation and ingestion of free fibres and associated burning resin products. Only personnel equipped with self-contained breathing apparatus (SCBA) or full-face canister respirators with appropriate cartridges should enter the accident site until all fires are extinguished and loose composite fibres are suppressed

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Toxic gases are also given off when some plastics and adhesives are burnt. After the fires have been extinguished, loose fibres should be avoided.

Bear in mind that some materials used in aircraft construction may be rendered harmful after heating in a fire and then being extinguished with water. Their products may be strongly acidic (e.g., fluoro polymers, which yield hydrofluoric acid), and are dangerous to ingest (e.g., some magnesium alloys or depleted uranium which corrodes very rapidly in the presence of water). It is imperative that all personnel at the accident site wash all exposed areas of skin before eating or drinking. Should emergency services personnel at the site exhibit respiratory distress or skin irritation, they should evacuate the site and institute procedures for liquid hazards.

High pressure containers are used in some aircraft systems. These containers when subjected to heat may be the source of secondary explosions. Pressurised containers likely to be encountered may consist of oxygen, liquid nitrogen, hydraulic accumulators, landing gear struts and fire extinguisher bottles (fixed and hand-held).

Dangerous/hazardous cargo and small amounts of radioactive material may be present or scattered on the accident site.



Appendix C

FUEL HAZARDS

Explosive devices

Explosive devices will be present if the aircraft is fitted with ejection seats, canopy jettison or canopy systems. Such devices will be concentrated in the cockpit area of the aircraft. Helicopters fitted with winches and cargo hooks may employ Electro-Explosive Devices (within the winch/reeling facility and/or cargo hooks) to enable emergency jettison of the cable or load. All due care should be exercised when operating near this equipment. Some aircraft utilise emergency flotation devices should it be necessary to ditch in the water. This equipment is generally located on helicopters near the outer central fuselage and may present an additional explosive danger to personnel should it be activated at an accident site.

Aircraft armament

Aircraft armament may be present in Irish Air Corps aircraft. These aircraft should only be approached from the rear, or a slight angle, until the absence of armaments has been confirmed. Such armaments may consist of a single weapon or a mix of high explosive, rockets, machine guns etc. Normally these items are carried under the wings and will be self-evident.

Accidental discharge of armament can occur through tampering with controls used to discharge the armament. Proceed with **EXTREME CAUTION** when extracting personnel or equipment located near operational controls (ie, control column or joystick), the instrument panel or any button or lever coloured red or marked with black and yellow stripes.

Pyrotechnics

Pyrotechnics will be present on most aircraft operated by the Irish Air Corps. They may consist of one or a mix of coloured signal flares, smoke generating devices and light emission devices. Such devices will normally be found in the main cabin area of larger military aircraft, the cockpit of smaller aircraft types and on personal survival equipment carried by the crew.

Appendix C

FUEL HAZARDS continued

A primary hazard in a post-crash aircraft fire is the presence of aircraft fuels which, if ignited, pose considerable danger to survivors, rescue personnel, etc. Fuel used by aircraft will come from one of the following groups:

Avgas is a high octane aviation petrol suited for piston-engined aircraft. It has a relatively low flash point and therefore highly flammable/volatile. Avgas is used in civil general aviation aircraft and small military type aircraft.

Avtur is the kerosene-type fuel used in all pure jet or turboprop aircraft and does not possess the low flash-point qualities of Avgas. However, when heated its flash point is reduced significantly. This fuel burns longer and more intensely than Avgas.

Diesel is also in use in some general aviation aircraft and has similar characteristics to Avtur.

Water Methanol is used in small quantities to provide extra power and as an additive to Avtur in certain flight situations, such as take-off. This substance is alcohol-based and burns without a visible flame. If ignited during a crash, problems are likely to be encountered with extinguishment, as alcohol foam would need to be used. Circumstances may be such that, due to the small amount by comparison to main fuel supplies, alcohol foam may not be needed, but its existence must always be considered.

Warning: Water methanol is toxic. Wear full protective clothing if substance is suspected.



Appendix D

RESCUE FROM AIRCRAFT FITTED WITH EJECTION SEATS AND EXPLOSIVE CANOPIES

Ejection seats may be activated by either overhead or seat-pan initiating handles.

When rescuing occupants from military aircraft fitted with ejection seats, EXTREME CARE is necessary to avoid injury to yourself and the seat occupant. Depending on the type of aircraft, as well as ejection seats, the canopy will have either an explosive canopy jettison or canopy disintegration system fitted. These can be actuated to gain access to seat occupants but are ONLY used if the manual cockpit opening system is inoperative.

Instructions for the use of the canopy jettison or canopy disintegration system will be printed next to their external controls. These controls will be sited in the vicinity of the cockpit. Read the instructions carefully before use as the canopy or canopy debris will be displaced violently when the system is actuated and can kill or injure unprotected bystanders.

If the manual canopy opening system is inoperative, no post-accident fire is evident, and the seat occupants do not appear to require immediate medical assistance, consideration should be given to waiting for specialist military rescue personnel to gain entry to the cockpit area.

Should you successfully gain access to the seat occupants DO NOT RAISE, MOVE, PULL OR TAMPER with any handles painted yellow and black on the ejection seats, as these fire or eject the seat, imposing extreme danger to yourself and seat occupants.



Appendix D

If possible, and with the assistance of crewmembers, insert safety pin(s) into ejection seat systems to render them inoperable. The safety pin(s) are usually located on the handle of the canopy or in a clearly marked compartment in the cockpit near the ejection seat.



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Before attempting to remove seat occupants remember to unfasten seat, shoulder and parachute harnesses, radio cords and oxygen leads. Take **EXTREME CARE** to ensure that the yellow and black coloured ejection seat actuating handles are not snagged when removing the seat occupants from the cockpit.

Note: These actions should only take place if **ABSOLUTELY** necessary, where danger to the occupant is evident. Safety pins are normally fitted into seat parts to prevent accidental operation of explosive devices when the aircraft is not in use. It is most unlikely that the safety pins will be in place. Accordingly, the ejection seats should **ALWAYS** be considered to be 'live' until specialist military personnel advise otherwise.

Remember spinal injury is common in ejection accidents so use due care in handling casualties who have ejected from aircraft.



Appendix E

Aircraft Accident/Incident - Passenger Questionnaire

The Air Accident Investigation Unit (AAIU), based in Dublin, is responsible for investigating aircraft accidents/incidents in Ireland. The aim is to maintain flight safety by thorough investigation and the gathering of information from passengers forms a vital part of this process. It would be appreciated if you could assist the investigation by completing the following questionnaire. Information contained in the questionnaire will be treated 'In Confidence'. Thank you.

Personal Details

Full name:

Address:

Telephone: (Home) (Work/Mobile) (E-MAIL)

Occupation:

Age: Gender: Male/Female

Seat Position

Sitting in row number/letter;
 Was this seat given on your boarding card? Yes/No
 If you do not recall your seat number please indicate:

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

Names of other persons travelling with you:

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

Was there a seat to your Right: Yes/No. Occupied: Yes/No. 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:

Appendix E

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 following illuminated: Cabin lights/Seat Belt Signs/Emergency Exit Lights.

Please indicate how you exited the aircraft:

Door/Over-wing Exit/Break in cabin wall

Left/Right

Please describe any difficulties encountered:

Steps/Escape Slide

Front/Centre/Rear

Injuries

Please briefly describe any injuries you suffered and how sustained?

Fire

Please describe any fire or smoke.

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General Comments

Is there anything else you feel would help in our investigation?

Thank you for helping our investigation. Please give this questionnaire to an AAIU Inspector, or mail it to the following address:

The Chief Inspector of Air Accidents
Air Accident Investigation Unit
Transport House, Department of Transport
44 Kildare Street
Dublin 2
Ireland.

If you have any questions, or points of view you wish to discuss with an investigator, please write to us at the above address or contact us by phone at 353-1-604 1293 or Fax at 353-1-6041514. More information on the AAIU is available on our web site at www.aaiu.ie. **Thank you**

