How to deal with an aircraft accident scene

South African Civil Aviation Authority
Accidents and Incidents Investigations Division

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Contents

The content of this booklet has been approved by the Accidents and Incidents Investigations Division (AIID) of the South African Civil Aviation Authority (SACAA) and adapted from a similar publication by the New Zealand CAA, with their permission. Its purpose is to provide guidance to the police, emergency services personnel and others in relation to aircraft accidents. It provides information on the actions to be taken should they witness or are required to attend an aircraft accident scene.

Accidents and Incidents Investigations Division (AIID)

The mandate of the AIID is to investigate all accidents and serious incidents in order to establish the cause of the accident and come up with safety recommendations to prevent recurrence of accidents. The aim of the investigation is not to apportion blame or liability but solely for safety purposes and to prevent accidents from happening in the future. Information emanating from accidents investigations is also used to recommend amendments to the regulations where necessary and for safety promotions.

What is an accident?

An accident is defined as an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft sustains substantial damage.

Investigation responsibilities

All aircraft accidents and incidents involving civilians must be reported at the SACAA (AIID). The AIID will then notify all relevant parties and conduct the investigation to establish the cause of the accident if deemed necessary.

The duration of the investigation of an accident may vary depending on the severity and complexity of an accident. The investigation may be conducted as a full on-site investigation with one or more investigators on site to gather information or as a postal investigation (office based) where an investigator does not go on site to gather information if it is not felt that field information will not provide any additional information.

Notification of an accident

South African Civil Aviation Regulations (Part 12) require operators and pilots to notify the Commissioner for Civil Aviation immediately after an aviation accident and incident.

In some circumstances, an operator may not be aware that their aircraft has been involved in an accident until quite some time after the event. Thus any person becoming aware of an accident is encouraged to notify the SACAA or any closest airport personnel or SAPS as soon as possible.

The AIID publishes a standby list of the investigator on duty on the CAA website (www.caa.co.za). Accidents can also be reported to the nearest Police station, emergency personnel or nearest airport.

Information to be notified

Notification of any aircraft accident should contain as much of the following information as possible. Do not delay notification because of the lack of this information

- Date and time of the accident
- Nature of the accident
- Aircraft type and registrations (registration marks normally begins with two letters, followed by a hyphen and three more letters e.g. ZS-ABC or ZU-ABC)
- Name of the operator or owner (e.g. SAA, Netstar, etc.)
- Location of the accident
- Name of the Pilot in Command
- Type of operation (e.g training, air transport, private, etc)
- Aircraft's last departure point and intended destination
- Description of the weather at the time of the accident
- Number of persons on board
- Number of persons killed or seriously injured as a result of the accident (on board)
- Number of persons killed or seriously injured as a result of the accident (on the ground)
- Any damage to property on the ground
- Details of damage to the aircraft
- Name of the person reporting the accident and their contact details for follow up.
- Any other pertinent information e.g. location and identification of any far-flung debris
- Names and contacts of any witness as well as any photographic or video footage available.

Custody and protection of the aircraft wreckage

It is important that the aircraft, and any ground marks made by it at the scene of the accident, are not disturbed unnecessarily. This requirement should not, however, prevent or impede any of the following:

- The extrication of survivors and animals from the wreckage.
- The protection of the wreckage, or contents, including mail or cargo, from destruction by fire or other cause.
- The removal of the aircraft and its contents to a place of safety when the aircraft is in or near water (eg, below the high-tide mark on a beach).
- The removal of the wreckage to prevent obstruction to public access or to other aircraft using the area, if no practical alternative is available.
- **The removal of goods or baggage under the supervision of a police officer**. In the case of a foreign aircraft, the goods or baggage shall not be removed from the vicinity of the aircraft – except with the consent of a customs officer.
- Wreckage should preferably be photographed/video taped before any removal.

In almost all accidents, no further unsupervised disturbance of the wreckage should be necessary after the occupants have been extricated.

Accessibility to the wreckage

The provisions of the Civil Aviation Rules, Part 12 stipulates that any aircraft involved in an accident effectively comes under the jurisdiction of the investigating authority. This means that even the pilot or owner does not have the right to access the aircraft without being authorised by the investigator in charge. It is accepted, however, that when an aircraft owner's property is likely to receive further damage following an accident they, or their representative, may have access provided they are under the supervision of a police officer. Any items removed should be recorded by the police officer.

Even if no field investigation is to be carried out, a clearance is still required from the Investigator in Charge for the wreckage to be recovered from the site.

Assisting the Investigation

Generally, police, fire, or ambulance personnel will be at the scene of an aircraft accident soon after it occurs. The accident investigator(s) may not reach the scene until several hours later, and possibly not until the following day. There are

a number of ways the investigation can be assisted during this waiting period.

Some of the precautions that should be taken are described as follows:

- **If disturbance of the wreckage is unavoidable, an endeavour should be made to photograph, sketch, or otherwise note the state of the wreckage prior to the disturbance. After disturbance, no attempt should be made to restore the wreckage to its original state, except as requested by the investigator.**
- A careful record should be made, as soon as possible, of the positions in the aircraft wreckage from which any occupants were assisted.
- A photographic or sketch record should be made of any marks on the ground of the wreckage, that might be obliterated or altered before the arrival of the investigator.
- The wreckage, and any of the aircraft's contents or papers, should be secured against loss or further damage.
- The position of any scattered wreckage located away from the main accident site should be noted, and measures taken to ensure that it is not disturbed.
- The names, addresses, telephone numbers, and intended movements of any witnesses should be noted. This same action should be taken in respect of any people who have taken photographs or video of the wreckage, or who have other evidence that might be relevant.

Any marks made on the ground should be recorded immediately

Hazardous Materials

There can sometimes be a variety of hazardous substances present at an aircraft accident scene. These can include:

- Toxic chemicals that could be inhaled, or affect the skin.
- Airborne synthetic products similar in nature to asbestos fibres.

Protective clothing provides protection against pathogenic substances

- Potentially explosive devices such as oxygen bottles, high-pressure tyres, hydraulic accumulators, and emergency parachutes (see below).
- Pathogenic substances.

Because of this, only persons essential for immediate post-accident actions (ie, police, emergency service personnel, and AIID staff) should enter the accident site – and only after taking appropriate precautions.

All investigators have equipment to provide protection against pathogenic substances that could be present.

Emergency Parachute Systems

Some aircraft are fitted with parachutes that the pilot can deploy in a severe emergency. In order to deploy and inflate the parachute rapidly they are propelled by small rocket motors, so they are often referred to as ballistic parachutes. These systems are more commonly found on microlight aircraft but some certified aircraft are also using them.

If an aircraft fitted with an emergency parachute system is involved in an accident, but the parachute is not deployed, the rocket motor can be a serious threat to emergency personnel.

Recognising an Emergency Parachute System

The firing handle (usually red) is mounted close to the pilot's seat. A cable will run from the handle to the parachute housing. The housing is usually external and obvious on microlight aircraft, but on larger aircraft they are often built-in behind a frangible panel.

The housing is usually a cylinder that can vary in size with the size of parachute, but is typically about 50 cm in length and 20 cm in diameter. The most common brand is Ballistic Recovery Systems (BRS) and their cylinders are white with the BRS branding showing prominently on them.

Various types of ballistic parachute systems

Attached to this will be a smaller cylinder, usually about 40 cm in length and 5 cm in diameter. This is the rocket motor and the cable from the firing handle will enter one end of it.

The rocket motor itself has two parts. The launch body, which will leave the launch tube when fired (and contains a propellant), and the igniter or trigger, which remains in the launch tube after detonation (this has shotgun primer and a thermalite charge). The open end, or the cap-covered end, of the launch tube is the exit point for the rocket – this is the dangerous end. No one should ever be in front of this end of the launch tube.

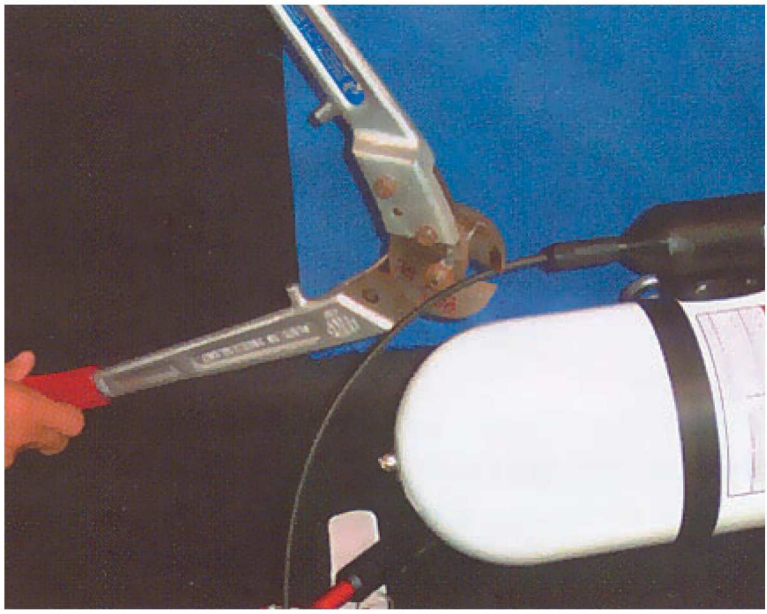
These parts could become separated during an accident sequence. The launch body (rocket) is a red anodised canister about the size of a large beer can. The igniter is smaller in length, aluminium coloured, and about 8 cm long with a nozzle aperture on it.

Making it Safe / Safety Precautions

This procedure should be carried out by trained rescue services personnel.

The firing mechanism requires a deliberate pull of 30 to 40 pounds to cock and fire the rocket. This equates to about 1.5 cm of movement on the cable at the trigger, but if the mechanism has suffered damage, it could be fired with much less movement.

Ordinary bolt cutters should **not** be used as they will tend to squeeze the cable housing out of the cutting jaws.



The cable should be cut with a specialised cable cutter tool, and as close to the rocket tube cable entry point as possible. When cutting the cable, care must be taken to avoid twisting the cutters.

Once the cable is cut, the unit can be considered safe to work around, but it is advisable to remove it to a safe location as soon as possible. Advice should then be sought from the police on disarming the rocket.

The instructions above apply to the BRS brand parachute system. Other brands are: Pioneer, Second Chantz, Advanced Ballistic Systems, Galaxy, or GQ Security. These systems are similar, but not identical.

Rescuers Beware

Beware of the potential of these devices. The rocket motors can accelerate to over 200 kph in the first tenth of a second after ignition. They don't fire for long, but could cause serious injury or even death. Keep in mind that a badly damaged aircraft may have already put the activating housing of an emergency parachute into a stretched state and this may make it close to detonation.

Post-mortem Examinations

Post-mortem examinations are usually carried out on the bodies of all crew and passengers dying as a result of a civil aircraft accident. The aim of such an examination is:

- to ascertain the cause of death.
- to identify the deceased.
- to obtain evidence either of pre-existing disease, or of the nature of the injury suffered, that may assist in identifying the cause of the accident.
- to obtain knowledge of mechanisms of injury, that may be applied towards the prevention of injury in future accidents.

Where possible, the pathologist responsible for an air accident post-mortem should have some knowledge of aviation-related injuries. There is at least one of these pathologists in each province on standby.

Assistance to Pathologists

In the event of fatal injuries occurring, the pathologist may be invited to visit the scene to discuss progress with the investigator early in the investigation.

Persons concerned with the preparation of material for an inquest should bear in mind that technical investigations have to be of sufficient depth to satisfy accident prevention measures. This often precludes the completion of an investigation, and hence the release of findings, until some considerable time after the accident.

The CAA will make findings available to interested parties, such as next of kin and the pathologist , when the investigation has been completed. The CAA accident report may be published on the CAA web site.

Search and rescue operation

In the case where an aircraft did not arrive on time at its destination, lost from the radar or cease to communicate with the air traffic unit, a search and rescue operation might be initiated in accordance with the standard Search and Rescue procedures and processes.

In many of these operations the local SAPS members, with members from other organisations, eg Local Emergency Response Organisations, Mountain Club, 4X4 Club, etc., are utilised to assist in the search operation. The search

may start with the search centre's co-ordinator requesting local SAPS officers to check for the aircraft at their local aerodrome. If the aircraft is not found the search will be escalated to a full search, which include aircraft flying and surface teams. This is obviously a very expensive operation. The SAPS co-operation in this matter is thus understandably very important and will be conducted in accordance with the SASAR ACT and the SASAR agreements with the SAPS.

Once the aircraft wreckage is located and the occupants of the aircraft are accounted for, the accident scene becomes the responsibility of the SAPS until the CAA Accident Investigator/s arrives and take control of it. This is generally a verbal handing over action, but could also be in a written format. The SAPS officers on scene needs to communicate with the CAA Accident Investigator/s to be able to co-ordinate the actions required on the scene (remember the CAA Accident Investigator/s are only a telephone call away).

Coordination with Police Inquiries

If the investigation of an aircraft accident has to be coordinated with police inquiries of any sort, such as in respect of some criminal offence, the investigator will provide assistance. In the event that the preliminary evidence indicates that the accident was the result of some criminal act, responsibility for the investigation will normally be handed over to the police. If necessary, the AIID investigator can appear as an expert witness at the inquest, but his or her primary responsibility under the Civil Aviation Act is to investigate the accident for safety prevention purposes – not to apportion blame or responsibility.

In general, evidence collected by an investigator as part of an air safety investigation is not taken in a form that is readily usable in court. For example, investigators do not normally take formal statements from witnesses.

Dealing with the media

The accident investigators of the SACAA have been empowered with training to deal with factual media questions at the scene of the accident. However, the SACAA would prefer that all queries be directed to the Senior Manager and Manager Communications on all accidents and incidents. As a result of this, accident investigators may refer the media to the communications department to handle all their queries. Further media queries regarding past and present accidents may be directed to the Senior Manager or Manager: Communications and they would then forward the queries to the Accident and Incident Investigations Department's Executive Manager who is authorized to provide responses to the media questions and give feedback on the progress of the investigation.

Completed accident reports

The CAA publishes all completed accident reports on the website (www.caa.co.za). In case of a fatal accident, the next of kin will be informed of

the availability of the report before it is published on the website. CAA will send preliminary confidential report to interested parties for comment before completing and publishing the final report.

Summary

Accident investigators can obtain / gather a great deal of information from the wreckage, ground markings, witnesses, videos, etc, during an aircraft accident investigation.

This knowledge can be used to help prevent the recurrence of the same accident from happening again. If those first to arrive at the accident scene unnecessarily disturb the wreckage, the deceased, or ground markings, the opportunity to obtain information from it may be lost.

It is therefore very important that the advisory information detailed in this booklet is followed by those involved. Doing so might just assist investigators with that crucial bit of information they need to determine the accident cause.

Accident Checklist

The following is a summary of action items and considerations that need to be taken into account should you be a witness to (ie, first on the scene), or be required to attend, an aircraft accident.

What to Do

- Exercise caution in regard to the potential hazards at an aircraft accident site. Do no more than is necessary to preserve life, before seeking advice from the investigating authority on any hazards that may be present.
- In particular, note the state of safety harnesses and positions of occupants as they are extricated.
- Within the limitations imposed by the actions necessary to preserve life, photograph, sketch or make notes of the wreckage disposition before disturbing it.
- Contact the CAA as soon as possible – see stand-by list on the CAA website
- Secure the accident site, including all scattered wreckage, as well as other evidence, such as marks made by the aircraft, ground scars, etc. (Do not attempt to move any scattered wreckage items.)
- Obtain the names, addresses, telephone numbers, and intended movements of witnesses. Note any witnesses who may have photographic or video evidence of the occurrence.

If fatalities occur

- Check with police before any action is taken to remove bodies.
- Check with the investigator in charge, if possible, to determine if there are any special requirements for in-situ pathological examination before the bodies are removed.

If bodies need to be moved before an investigator arrives

- Carefully record the posture and position of each body (preferably with photographs and/or sketches).
- Minimise any disturbance of the wreckage during removal of bodies.
- Do not attempt to restore disturbed wreckage to its original state.
- Do not release the wreckage, or any part of it, to anyone until it is confirmed that the investigating authority has relinquished custody of the wreckage.

All queries can be directed to AIID

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