

# Fire and Rescue Service Operational Guidance

# GRAs

generic risk assessments

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## **GRA 4.3**

Incidents involving  
transport systems – Air

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# **Generic Risk Assessment 4.3**

Incidents involving  
transport systems – Air

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## SECTION 1

# GRA 4.3 Incidents involving transport systems – Air

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## Scope

This Generic Risk Assessment (GRA) examines the hazards, risks and control measures relating to incidents attended by the Fire and Rescue Service (FRS) involving aircraft.

The term aircraft is used to describe all types of flying machines:

- fixed wing
- rotary wing (helicopters, gyro planes etc.)
- balloons
- airships
- gliders
- unmanned aerial systems (could be any of the above)
- micro-lights.

FRSs attend numerous incidents involving a variety of aircraft types. The kinds of incidents vary greatly and can result in fires, rescues and scene safety.

Activities relating to aircraft accidents involving more specific and significant hazards, for example hazardous materials or explosives, are covered in other GRAs in this series.

As with all GRAs this assessment provides a starting point for individual FRSs to conduct their own assessments, produce their own Standard Operating Procedures (SOPs) and written Safe Systems of Work (SSoW), within the context of local conditions and existing organisational arrangements.

## Significant hazards and risks associated with aircraft incidents

### Aircraft construction

As diverse as the variety of aircraft are the materials used in their construction. These materials, which may be encountered when dealing with aircraft related incidents, can produce harmful gases, vapour and particulates when subjected to the extreme effects of air accidents.

## Most common materials used in aircraft construction

<b>Aluminium</b>	used in aircraft structures.
<b>Magnesium and titanium</b>	used in components such as wheels and gearboxes.
<b>Other metals and alloys</b>	used in engines and systems.
<b>Composite materials</b>	used extensively in modern aircraft construction both civil and military.
<b>Plastics</b>	form the basis of most interior furnishings and fitting.

The use of composite materials in the construction of aircraft today is extensive. Components made of composite materials are retrofitted to older aircraft.

Composites used in aircraft manufacture are referred to as Polymer Composites. They describe a wide range of materials which utilise the inherent strength and durability of woven fibres bonded together with resins.

The principle hazard from composite material to personnel arises from the decomposition of the material both during and after an aircraft fire. The fibres will be left in a friable condition that is easily liberated when touched. The fibres are likely to be respirable in size and could easily cause needle stick injuries and traumatic dermatitis, similar to that associated with glass fibre.

Similar hazards exist when cutting composites, whether or not involved in fire.

The material may plume following a crash and be carried considerable distance downwind. Fibres associated with composite materials are capable of becoming contaminated with products of a post-crash incident, such as:

- fuel and oils
- bio hazards
- chemicals
- products of combustion.

### Damaged structures

Accident/fire damaged aircraft present a variety of hazards, such as:

- sharp and jagged edges
- unstable or weak structures
- retained energy
- ruptured fuel tanks.

### Aircraft engines

Aircraft engines present a significant hazard to personnel. The types of engines that may be encountered are:

- piston
- turbine
- turbo jet
- turbo prop
- auxiliary power unit (APU).

Principle hazards from engines are:

- spinning propellers/rotas
- hot exhaust outlets
- moving engine parts
- pressurised fuel and oil systems
- engine intake/exhaust areas
- noise
- hot gases.

### **Aircraft fuels**

Fuels fall broadly into two types (a) Gasoline (petrol), and (b) Kerosene.

Principle hazards from fuels are:

- highly flammable
- explosive
- corrosive
- toxic
- irritant
- volume of fuel carried.

Post accident FRS operations pose a significant hazard in relation to fuel spillages on or around the crash site.

Hot-air balloons and airship's envelopes are filled with hot air that has been heated by powerful burners fuelled by liquid petroleum gas, usually propane. This presents a fire/explosive hazard plus hot surfaces associated with the burners.

## **Pressurised Systems**

For example:

- liquid oxygen cylinders
- fire extinguishers
- cargo fire suppression systems
- escape slide inflation cylinders
- hydraulic systems
- pyrotechnic flares
- tyres and undercarriage.

Pressures of the above systems can be up to several thousand psi/several hundred Bar. Sudden release of these pressures can pose hazards in terms of impact, absorption, inhalation and fire.

## **Electrical Systems**

Depending on type of aircraft, electrical systems, supplied by APUs or batteries may be present and can deliver different voltages and very high currents.

## **Fluoroelastomers**

Fluoroelastomers can be found in hydraulic systems and engine seals. When exposed to significant fires they are likely to decompose into hydrofluoric acid.

## **Confined Working Conditions**

Confined working conditions for firefighters carrying out rescue operations, due to:

- internal layout of the fuselage
- resultant post-crash disruption of internal fittings
- poor/no internal lighting.

## **Recovery Systems**

Some light aircraft/micro-lights are fitted with a rocket-activated recovery parachute system. Activated systems will be obvious and represent little or no hazards. Inactivated systems may be difficult to identify and represent significant ballistic projectile hazard.

## **Airbags**

Airbag systems can be found in some light and larger commercial aircrafts. These are incorporated into the seatbelt/harnesses assemblies.

## Payload

In civil and military aircraft the payload will either be:

- passengers
- cargo
- a combination of both

The hazards associated with **passengers**, may include:

- human behaviour
- difficulties associated with the mass egress
- impact from passengers evacuating by chutes
- biological
- manual handling.

The hazards associated with **cargo** may include:

- unsecured loads
- unstable loads
- manual handling
- hazardous materials/explosives.

There will be a wide range of items that are carried as cargo. Some of which will be classed as dangerous goods and other cargos, which on their own are non-hazardous, may become hazardous post accident, due to mixing with other cargos.

## Biological

Toilet waste (raw sewage) may present a significant biological hazard.

## Blood borne pathogens

Blood-borne pathogens are commonly associated with transport incidents. Aircraft accidents present different challenges due to the potential for a large number of casualties. In addition, high speed impact accidents can generate traumatic damage to casualties that presents significant difficulties in the rescue and recovery phases of an incident.

## Equipment in use

Working at aircraft incidents will often involve the use of specialist equipment. The type of equipment and the hazards involved will vary but typically may include:

- manual handling of heavy equipment over difficult terrain and within confined spaces
- potential injury caused by failure of equipment, causing collapse or sudden movement of loads under pressure

- cuts/nip/trap or entanglement hazards from moving parts of equipment
- excessive noise and/or vibration
- damage to high-pressure hydraulic or pneumatic systems involved with cutting or spreading tools can cause soft tissue damage
- burns from hot/cold components
- accidental ignition of fuels.

## **Psychological trauma**

Due to the nature of aircraft accidents and the possibility of large numbers of casualties, there is a risk to responding FRS personnel of psychological trauma, which may cause a stress reaction.

## **Limited experience**

Attending aircraft accidents are incidents that local authority FRSs have limited experience of, due to the infrequency of this type of incident. Therefore the hazard is the potential lack of operational experience by attending personnel and the moral/societal pressure on FRS personnel to save lives regardless of resources, training and experience.

## **Hazards specific to military aircraft/ex-military aircraft**

### **Pyrotechnics**

Pyrotechnics may be encountered as an intrinsic part of an aircraft defence and survival system, they may include explosive stores ranging from HD 1.1 to HD 1.4 for example:

- ejection seats (Aircraft Assisted Escape Systems)
- miniature detonating cord – canopy
- canopy ejection systems/cartridges
- pylon squibs -under wing jettison devices
- marina markers and floats
- reconnaissance and target flares
- aircraft destructor
- countermeasures – chaff and infrared flares.

## **Armaments**

Aircraft armaments – principal types:

- bombs
- rocket projectiles
- guided missiles
- small arms ammunition
- guns
- torpedoes.

## **Radio frequency**

Radio frequencies may inadvertently initiate some explosive devices.

## **Radioactive hazards**

Radioactive materials are contained within Forward Looking Infrared (FLIR) Pods, found in some gun ammunition and in aircraft construction.

## **Laser hazards**

Laser hazards may arise from laser targeting designators pods located on some aircraft fuselage.

## **Additional hazards associated with helicopters and military helicopters**

### **Water actuated devices**

Water actuated devices such as buoyancy bags or inflation packs, may be fitted to helicopters that operate over water. These present a hazard if accidental/unplanned actuation occurs.

### **Automatic Deployable Emergency Locator Transmitter**

ADELTA creates a projectile hazard to personnel.

### **Rotor blades**

Tail rotors and main rotor blades present a significant hazard to firefighters if still rotating and at crash sites as they may:

- be made of a composite material
- have a stored energy risk.

# Key control measures

## Pre-planning

An essential element of management of risk is pre-planning. The integrated Risk Management Plan (IRMP) will identify FRS standards in terms of equipment and operational personnel required for SSoW to be employed.

FRSs should collate information on the risks in their area and make site specific risk information available to all relevant personnel prior to and upon arrival at incidents. This approach will help to ensure that work activity is planned, supervised and carried out safely.

FRSs should use appropriate SSoW, training, supervision, equipment and specialist personal protective equipment (PPE) to ensure the safe operational conclusion of these types of incidents.

FRSs should undertake debriefs as appropriate and feed any significant learning points back into the development of SSoW, training programmes and equipment procurement.

FRSs should create Standard Operating Procedures based on task analysis and risk assessments to ensure that the full ranges of incident types are provided for. This should include arrangements with other FRSs and partner agencies.

- police
- Ambulance Service
- Airport Fire Service
- Air Accidents Investigation Branch
- military
- local authority.

Their advice will assist with cordons and to gain a full appreciation of the extent of hazards associated with the specific type of aircraft involved.

FRSs should collate information on the risks in their area and make site-specific risk information available to all relevant personnel prior to and upon arrival at incidents. Such information may include:

- airport locations and topography
- major route access points and the location/operation of water supplies and drainage systems
- familiarisation with airfields and types of aircraft that operate from those locations will also help local crews take the most suitable route to an incident and to consider in advance the establishment of a safe working area appropriate to the incident type attended

- in planning for these types of incidents consideration must be given to marshalling points, rendezvous points (RVP's) and strategic holding areas
- consideration should be given to difficult locations.

On occasions, there can be difficulty with water supplies at crash sites. FRSs must take account of this and develop plans to augment water supplies.

## **Training**

Section 2 of the Health and Safety at Work etc Act 1974 lays down the general duties of employers to their employees.

Section 2 (2) (c) of the act requires employees to provide information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees;

When formulating a training strategy FRS should be mindful of the following points:

- All FRSs must ensure their personnel are adequately trained to deal with risk/hazard associated with rescues from aircraft.
- The level and nature of training undertaken should be shaped by an informed assessment of operational and individual needs in line with the FRS guidance on the integrated personal development system; national occupational standards and any internal training plan.
- Training and development should follow the principles set out in national guidance documents. Training programmes should generally be structured so that they move from simple to more complex tasks and from lower to higher levels of risk.
- Training and development will typically cover standard operational procedures as well as ensuring knowledge and understanding of equipment and the associated skills that will be required to use it.
- Training programmes need to consider the need for appropriate levels of assessment and provide for continuous professional development, to ensure maintenance of skills and to update personnel whenever there are changes to procedure, equipment, etc.

Training outcomes should be evaluated to ensure that the training provided is effective, current and is meeting defined operational needs as determined by the FRS Integrated risk management plan.

## **Command and control**

The Incident Commander (IC) should adhere to the principles of the current national incident command system. Prior to committing personnel to any hazard area the IC must take into account all known relevant factors before selecting the appropriate SSoW.

A thorough safety brief prior to deployment of personnel within the hazard zone must be carried out.

This should include the use of cordons. Cordon control is key in reducing operational personnel's exposure to hazards, to as low as is reasonably practicable.

Cordons need to be suitable and sufficient and will need to take into consideration many factors which may include:

- wind direction/weather conditions
- size of the aircraft involved
- engine hazard zones (which will differ considerably with engine size and type)
- slide path
- debris
- casualties
- fuel spillages
- hazardous substances
- post incident investigations Police/Air Accidents Investigation Branch
- topography
- aircraft armaments.

A cordon distance of 300m has historically been advised but this needs to be assessed at the time of the incident and increased or decreased as necessary.

Safety distances for military aircraft vary for example:

- flares 200m
- unexploded aircraft ordinance 400m
- guns have a range of 7.5 Km and rockets 11Km – if functioning as intended. However the military view is once an aircraft has crashed ordinance will not function fully but may partially activate.

Specialist advice should be sought at the earliest opportunity when assessing cordon distances.

Aircraft incidents are usually attended by more than one emergency service and early liaison with other services must be undertaken to ensure a co-ordinated and safe response.

### **Personnel protective equipment (PPE)**

FRSs must ensure that any PPE provided is fit for purpose and meets required safety standards. When choosing suitable protective garments, the standard of clothing worn beneath the specialist PPE should also be taken into account. Consideration should also be given to the selection of suitable sizes of PPE.

PPE should also take account of the need for rescuers to be visible against the operational background including night working and for team leaders to be distinguishable within ICS.

All personnel must use appropriate levels of PPE including climatic (heat, cold, wet and inclement weather) and Respiratory Protection Equipment (RPE) where necessary.

### **Safe systems of work (SSoW)**

All of the above-mentioned control measures will contribute to the creation of SSoW. There are a number of other factors that may need to be taken into account.

Aircraft incidents will always involve joint agency working; SSoW need to include procedures to ensure the safety of other agencies on the scene.

FRS vehicles should be positioned in such a position to take into account incident hazards.

FRSs should make provision for suitable lighting on the incident ground.

FRSs should have procedures and training in place for dealing with violent or aggressive behaviour.

<b>Technical references</b>	
1	Air Accidents Investigation Branch – aircraft accidents guidance for the Police, Emergency Services and Airfield Operators. 2008
2	Airports and Aircraft Fire Protection, Fire Fighting and Rescue Techniques – Institute of Fire engineers 1990
3	FRS manual volume 2, Fire Service Operations “Aircraft Incidents” 1999
4	Institution of fire engineers “Airports and Aircraft Fire Protection, Firefighting and Rescue Techniques <i>2nd edition</i> ”.
5	MOD JSP 551: Military Flight Safety Regulation Vol 2 – Aircraft Post Crash Management
6	Fire Service Circular 67/2008 Aircraft Ballistic Recovery Systems
7	Serco Aviation training notes 2006 – courtesy International Fire Training Centre Teeside
8	Fire Cover review “Technical Paper C” main report 2002

## SECTION 2 Summary of GRA 4.3

### Incidents involving transport systems – Air

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
1	All tasks on crash site Fire Service operations	<ul style="list-style-type: none"> <li>Materials used in aircraft construction.</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by corrosive/toxic materials</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other responding emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Provision of risk critical information in relation to hazardous materials</li> <li>Provision of risk critical information in relation to aircraft construction</li> <li>Adequate and appropriate PPE to include respiratory protection and chemical protection where necessary</li> <li>Facility for decontamination or disposal of PPE and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>7. 2. d Familiarisation Visits</li> <li>Safety Officers</li> <li>Liaison with military command centres and on scene advisors</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
2	All tasks on crash site Fire Service operations	<ul style="list-style-type: none"> <li>Smoke, flames and toxic gases</li> <li>Reactive components, burning fuel etc</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by burns, inhalation of smoke and gases</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other responding emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft construction and associated hazards</li> <li>Safety Officers</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
3	Post fire hazards	<ul style="list-style-type: none"> <li>Hazardous materials used in the construction of aircraft such as polymer composites, fluoroelastomers, hydrofluoric acid</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by toxic materials</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other responding emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft construction and associated hazards</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
4	Fire Service operations working on/in/ around damage structures	<ul style="list-style-type: none"> <li>• Collapse of weakened structure</li> <li>• Sharp jagged edges</li> <li>• Weak and unstable structures</li> <li>• Top-heavy aircraft – e.g. helicopters</li> </ul>	<ul style="list-style-type: none"> <li>• Injury caused by collapsed structures, and aircraft components</li> </ul>	<ul style="list-style-type: none"> <li>• Operational personnel</li> <li>• Members of public</li> <li>• Other responding emergency services</li> </ul>	<ul style="list-style-type: none"> <li>• Safety Officers</li> <li>• Liaison with military command centres and on scene advisors.</li> <li>• Training and supervision</li> <li>• Adequate and suitable PPE</li> <li>• Safety Officers</li> <li>• Communications systems</li> <li>• Fire fighting procedures and equipment</li> <li>• Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>• Liaison with military command centres and on scene advisors.</li> </ul>
5	Fire Service operations in the vicinity of aircraft engines	<ul style="list-style-type: none"> <li>• Spinning propellers/rotors</li> </ul>	<ul style="list-style-type: none"> <li>• Injury caused by direct contact/ propeller wash</li> </ul>	<ul style="list-style-type: none"> <li>• Operational personnel</li> <li>• Members of public</li> <li>• Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>• Training and supervision</li> <li>• Safe approach</li> <li>• Adequate and appropriate PPE</li> <li>• Adequate and appropriate respiratory protection</li> <li>• Firefighting procedures and equipment</li> <li>• Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>• Safety Officers</li> <li>• Liaison with military command centres and on scene advisors.</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
6	Fire Service operations in the vicinity of aircraft engines	<ul style="list-style-type: none"> <li>Exhaust areas</li> </ul>	<ul style="list-style-type: none"> <li>Injury caused by noise/hot-expelled gases</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Exclusion zones to the rear of jet engines</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
7	Fire Service operations in the vicinity of aircraft engines	<ul style="list-style-type: none"> <li>Induction into turbines</li> </ul>	<ul style="list-style-type: none"> <li>Injury caused to personnel by direct induction or the induction of equipment.</li> <li>Noise</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Exclusion zones forward of engine intakes</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
8	Fire Service operations – aircraft fuel spillages	<ul style="list-style-type: none"> <li>Highly flammable, explosive, corrosive, irritant and toxic</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by exposure and contact</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public.</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft fuel and associated hazards</li> <li>Safety Officers</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
9	Internal rescue and fire fighting	<ul style="list-style-type: none"> <li>Pressurise systems, fixtures and fittings, electrical system hydraulic systems, confined working conditions</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by exposure and contact</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Other emergency services</li> <li>Members of public</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Communication systems</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft construction and associated hazards</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
10	Fire Service operations on or around aircrafts fitted with ballistic recovery systems	<ul style="list-style-type: none"> <li>Ballistic pyrotechnics</li> </ul>	<ul style="list-style-type: none"> <li>Injury caused by uncontrolled actuation</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>7. 2. d familiarisation visits</li> <li>Safety Officers</li> <li>Liaison with military command centres and on scene advisors.</li> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Firefighting procedures and equipment</li> <li>Provision of risk critical information in relation to ballistic recovery systems</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Safety Officers</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
11	Fire Service operations/ External hazards	<ul style="list-style-type: none"> <li>Exploding tyres, wheel assembly/collapsing undercarriage</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness projectile wheel/undercarriage components</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel.</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision.</li> <li>Safe approach.</li> <li>Adequate and appropriate PPE</li> <li>Firefighting procedures and equipment</li> <li>Controlled use of radio</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft systems and associated hazards</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
12	Hazard specific to military aircraft and ex-military aircraft. Fire Service operations	<ul style="list-style-type: none"> <li>Pyrotechnics, explosives &amp; aircraft armaments.</li> <li>Radar systems and high electromagnetic radiation</li> </ul>	<ul style="list-style-type: none"> <li>Injury and illness caused by exposure or contact, caused by uncontrolled/controlled actuation</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel.</li> <li>Members of public.</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Safety Officers</li> <li>Liaison with military command centres</li> <li>On scene military advisers</li> <li>7. 2. d familiarisation visits</li> <li>Liaison with military command centres and on scene advisors.</li> <li>Training and supervision.</li> <li>Safe approach.</li> <li>Adequate and appropriate PPE.</li> <li>Firefighting procedures and equipment</li> <li>Controlled use of radio</li> <li>Time distance shielding</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to aircraft systems and associated hazards</li> <li>Safety Officers</li> <li>Liaison with military command centres</li> <li>On scene military advisers</li> <li>7. 2. d familiarisation visits</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
13	Hazard specific to military aircraft and ex-military aircraft Fire Service operations	Lasers and defensive aid suits	Injury resulting from uncontrolled actuation	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Provision of risk critical information in relation to helicopter construction and associated hazards</li> <li>Safety Officers</li> <li>7. 2. d familiarisation visits</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
14	Additional hazards associated with helicopters and military helicopter Fire Service operations	Water actuated buoyancy bags Automatic deployable emergency locator transmitters	Injury resulting from uncontrolled actuation	<ul style="list-style-type: none"> <li>Operational personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
15	Fire service operations around cargo holds	<ul style="list-style-type: none"> <li>• Large variety of different cargoes ranging from livestock to military hardware</li> <li>• Confined space of cargo areas incorporating trip hazards and crush hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Injury/illness due to contact or exposure to cargo and cargo handling systems</li> </ul>	<ul style="list-style-type: none"> <li>• Operational personnel</li> <li>• Members of public</li> <li>• Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of risk critical information in relation to helicopter construction and associated hazards</li> <li>• Safety officers 7. 2. d familiarisation visits</li> <li>• Liaison with military command centres and on scene advisors.</li> </ul>
					<ul style="list-style-type: none"> <li>• Training and supervision</li> <li>• Safe approach</li> <li>• Adequate and appropriate PPE</li> <li>• Adequate and appropriate respiratory protection</li> <li>• Firefighting procedures and equipment</li> <li>• Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>• Provision of risk critical information in relation to aircraft manifests</li> <li>• Provision of risk critical information from Chemical databases</li> <li>• Liaison with military command centres and on scene advisors</li> <li>• Safety Officers</li> <li>• Liaison with military command centres and on scene advisors.</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
16	Rescue and fire fighting operations involving aircraft accidents	<ul style="list-style-type: none"> <li>Blood borne pathogens</li> </ul>	<ul style="list-style-type: none"> <li>Illness as a result of direct contamination or cross contamination to other casualties</li> </ul>	<ul style="list-style-type: none"> <li>Fire service personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Facility for decontamination or disposal of PPE and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Safety Officers.</li> </ul>
17	Use of Fire Service equipment to undertake firefighting and rescues	<ul style="list-style-type: none"> <li>Manual handling</li> <li>Failure of equipment causing sudden collapse or movement of loads</li> <li>Cuts/Nips/Trap or entanglement hazard from moving parts</li> <li>Noise and vibration</li> <li>High-pressure hydraulic systems</li> <li>Burns</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness resulting from exposure or contact</li> </ul>	<ul style="list-style-type: none"> <li>Fire service personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Safe approach</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Manual handling training</li> <li>Adequate and appropriate PPE</li> <li>Adequate and appropriate respiratory protection</li> <li>Firefighting procedures and equipment</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Safety Officers.</li> </ul>

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
18	All crash sites	<ul style="list-style-type: none"> <li>Site conditions, debris lubricants etc strewn around the incident ground</li> <li>Foam blanket coverage hiding any of above</li> </ul>	<ul style="list-style-type: none"> <li>Potential slip, trip and falls</li> </ul>	<ul style="list-style-type: none"> <li>Fire service personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Adequate lighting where necessary</li> <li>Secure site reasonably practical to do so, establish cordons</li> <li>Safety brief for attending personnel.</li> </ul>
19	Rescue of casualties from aircraft accidents	<ul style="list-style-type: none"> <li>Stress reaction</li> </ul>	<ul style="list-style-type: none"> <li>Illness as a result of direct or indirect exposure to incident</li> </ul>	<ul style="list-style-type: none"> <li>Fire service personnel</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Safety Officers</li> <li>Incident debriefs</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>
20	Attending aircraft accidents Fire Service operations.	<ul style="list-style-type: none"> <li>Limited experience.</li> </ul>	<ul style="list-style-type: none"> <li>Injury/illness caused by lack of knowledge or poor safe systems of work</li> </ul>	<ul style="list-style-type: none"> <li>Fire service personnel.</li> <li>Members of public</li> <li>Other emergency services</li> </ul>	<ul style="list-style-type: none"> <li>Training and supervision.</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Safety Officers</li> <li>Incident debriefs</li> <li>Limited exposure of personnel wherever possible. As low as reasonably practicable by strict cordon control</li> <li>Liaison with military command centres and on scene advisors.</li> </ul>