

8 MARCH 2005



Maintenance

**RECOVERY OF CRASHED, DAMAGED,
OR DISABLED AIRCRAFT**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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(Mr. Gerald Gipaya, WS-10)
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This is not an initial response instruction. It provides the basic procedures to be followed for aircraft recovery/removal in the event of crash/disabled aircraft after all initial response events have been accomplished. 15th Airlift Wing provides crash recovery for base assigned aircraft (C-37, C-40, C-135, C-130, and F-15) and contains procedures for the recovery of crash/disabled US military and military contracted aircraft landing at Hickam AFB or on the island of Oahu in support of the 15th Airlift Wing. Physical aircraft removal procedures will not be implemented until approved by the Safety Investigation Board or 15 AW/SE. It applies to all personnel assigned to the 15th Airlift Wing and tenant units who have responsibility for the above actions.

SUMMARY OF REVISIONS

This revision incorporates significant changes from the previous version. All personnel should read this instruction carefully.

1. References.

- 1.1. AFI 21-101, Aerospace Equipment Maintenance Management.
- 1.2. AFI 21-101, PACAF SUP 1, Aerospace Equipment Maintenance Management.
- 1.3. AFI 51-503, Aerospace Accident Investigation.
- 1.4. AFI 91-204, Safety Investigations and Reports.
- 1.5. 15 AW OPlan 91-1, Mishap Response.
- 1.6. DOD OPlan 409, Support Plan for the DOD Manager's Space Transportation System Contingency Support Operation Plan.
- 1.7. Institute for Environment, Safety, and Occupational Health Risk Analysis (Composite Materials).

- 1.8. AFI 34-242, Chapter 6, Search and Recovery (SAR)
- 1.9. Support Agreement # FB5260-01201-533 (735 AMS & 15 AW)
- 1.10. Support Agreement # FB5260-95353-508 (HIANG & 15 AW)
- 1.11. Support Agreement # FB5260-00284-536 (ASC & 15 AW for C-40 support)
- 1.12. Support Agreement # FB5260-00284-537 (ASC & 15 AW for C-37 support)

2. RESPONSIBILITIES :

2.1. Initial Response.

2.1.1. On-Scene Commander (OSC):

2.1.2. The Hickam AFB Fire Chief will be the initial OSC and will coordinate survivor rescue, fire fighting, health hazard assessment, explosive ordinance disposal (if required), and crash site recovery prior to releasing the site to the 15 AW/CC designated OSC (15 MSG/CC).

2.1.3. Initial Operations to include rescue, fire suppression, safeing of weapons, securing the crash site, collateral damage and other immediate actions necessary to prevent loss of life and property will be accomplished IAW 15 AW OPlan 10-2.

2.2. 15th Aircraft Maintenance Squadron (15 AMXS) Repair & Reclamation Section

(15 AMXS/MXFD) will:

2.2.1. Act as Hickam AFB primary OPR for Crashed, Damaged or Disabled Aircraft Removal (CDDAR) program.

2.2.2. Train all personnel assigned to the Crash Recovery Team (CRT). Training will be documented in the Core Automated Maintenance System (CAMS).

2.2.3. Establish and maintain a basic crash equipment reference checklist to be used by aircraft type (See **Attachment 1: Checklist 1A, 1B, 1C**).

2.2.4. Furnish a Crash Recovery Team (CRT) for in-flight and ground emergency response. Team will consist of minimum of 15 personnel, (See **Attachment 2**) one of which will be the 15 AMXS/MXFD section supervisor.

2.2.5. Maintain a recall roster for after normal duty hour notifications.

2.2.6. Maintain 15 AW crash recovery trailer.

2.2.7. Will ensure that CRT has proper Personal Protective Equipment (PPE).

2.3. 15 AMXS/Transient Alert Contractor (15 AMXS/TA) will:

2.3.1. Provide escort for the crash recovery team as needed when a mishap occurs on an active runway or taxiway at Honolulu International Airport.

2.3.2. For transient aircraft, TA will provide technical assistance to crash recovery team and perform required ground handling procedures.

2.4. 15 AMXS Maintenance Operations Control Center (MOCC) will:

2.4.1. Coordinate requests to obtain ground-handling procedures for applicable aircraft from the owning command or contractor as required. The owning command or contractor will be responsi-

ble for providing personnel, supplies, equipment, and technical expertise as needed to assist the crash recovery team in the safe removal of mishap aircraft IAW AFI 91-204.

2.4.2. Coordinate with base Civil Engineering Squadron for support equipment and other necessary supplies as determined by the CRT supervisor for recovery/removal actions. In the event it becomes necessary to immediately clear the runway without consideration of additional damage to the aircraft, MOCC will coordinate expediting any additional heavy equipment items.

2.4.3. Recall CRT personnel after normal duty hours.

2.5. 15th Services Squadron will:

2.5.1. Direct and conduct SAR operations. Additionally, they will make meals available and provide ice as needed for all crash recovery actions and exercises.

2.6. 15th Civil Engineer Squadron will:

2.6.1. Procure and deliver plywood, shoring, heavy equipment and other necessary supplies needed for recovery/removal actions.

2.7. 15th Airlift Wing Safety Office (15 AW/SE) will:

2.7.1. Activate a fund cite to procure needed supplies. Note: Units are responsible to procure and provide their own personnel with proper PPE.

2.7.2. Develop a site safety and health plan with Bioenvironmental Engineering (15ADS/SGGB).

2.7.3. For common crash site hazards and PPE requirements see [Attachment 4](#).

2.8. Hawaii Air National Guard (HIANG) 154th Wing will:

2.8.1. Respond to 15 AW support requirements for Crashed, Damaged, Disabled Aircraft Recovery (CDDAR).

2.8.2. Provide aircraft (F-15, C-130, KC-135) and personnel for training requirements and exercises.

2.8.3. Be subject matter experts on CDDAR procedures for F-15, KC-135 and C-130 airframes.

2.8.4. Provide F-15, KC-135, C-130 unique CDDAR equipment.

2.9. Air Mobility Command (AMC) 735th Air Mobility Squadron (AMS) will:

2.9.1. Coordinate with 15 AW to provide aircraft for training requirements and exercises. 735 AMS personnel are required to train with 15 AW personnel.

2.9.2. Coordinate with 15 AW to execute exercises and participate in real world events.

2.9.3. As part of the overall crash recovery program, 735 AMS will provide familiarization training on non 15 AW assigned AMC aircraft.

2.9.4. As host, 15 AW is responsible for crashed/disabled aircraft IAW 15 AWI 21-107 and will provide 735 AMS in-house CDDAR procedural training for 735 AMS personnel; however, 15 AW does not have specific AMC airframe CDDAR experience or capabilities.

2.9.5. Be subject matter experts on CDDAR procedures for AMC airframes.

2.9.6. Provide CDDAR equipment for AMC unique airframes.

2.10. Contractor Logistics Support Aircraft (C-37A and C-40B)

2.10.1. Boeing and Gulfstream will assist/perform crash recovery and salvage operations for C-40 and C-37 respectively. These operations will be on an over and above contract cost basis. The over and above costs for these operations will be funded as part of the mishap costs.

2.10.2. 15 AW will provide local crash recovery support within its capabilities.

2.10.3. Boeing and Gulfstream will provide special equipment and technical data as required. Contractors will also provide 15 AW with aircraft familiarization training as required and ensure aircraft and appropriate equipment is available for recovery exercises as required.

2.11. 15 CES Bioenvironmental Flight (15 ADS/SGGB) will provide a briefing to the CRT on all known hazards and PPE requirements prior to the CRT accessing the site.

3. Procedures

3.1. The Disaster Control Group (DCG) Maintenance Supervisor will coordinate requirements with the 15 AW Command Post for the use of off-base specialized equipment and for specialist support as required.

3.1.1. If a crane is needed, 15 AMXS/MOCC will coordinate with Public Works Center (PWC) Pearl Harbor, Crane and Rigging Services, at 474-5793 ext 237 for the use of a crane and qualified operator.

3.2. Vehicle Management Flight (15 LRS/LGRV), Vehicle Operations Section, at DSN 315 449-1742 will:

3.2.1. Provide a 7-1/2 ton tractor and qualified driver to the crash recovery trailer located in Hangar 34, Bldg 1055.

3.2.2. Upon request, provide additional equipment as required to the crash recovery site, i.e., flat-bed trailers, tractor, PPE, etc.

3.3. The crash recovery team will not destroy or remove wreckage without the agreement of the Safety Investigation Board (SIB) and Accident Investigation Board (AIB), except for essential rescue or to prevent interference with airfield operations or vital civil functions.

3.4. In the event of fatalities, the crash recovery team will not remove the wreckage, or portions of the wreckage, until coordinated with and approved by the Search and Recovery (SAR) team chief.

3.5. The maintenance supervisor or crash recovery team chief will obtain a signed release (**Attachment 3**) from Honolulu International Airport manager before handling any civilian type aircraft. See FB5260-99333-900 for additional guidance.

3.6. Upon notification of an in-flight/ground emergency or crash/disabled aircraft, 15 AMXS/MXFD will:

3.6.1. Log all information received over emergency response phone or radio, including aircraft type, location, and nature of emergency. Assemble crash recovery personnel and equipment at the crash trailer, Hangar 34, Bldg 1055, and issue safety equipment as required to identify the recovery crew. Notify the OSC through the DCG Maintenance Representative their team is assembled and ready to respond. The crew will proceed to the crash site only upon approval from the OSC.

- 3.6.2. Team chief will brief personnel on crash/disabled aircraft condition, the possibility of human remains and importance of not touching or disturbing them, and overview all safety precautions.
- 3.6.3. Ensure the crash recovery team reviews individual responsibilities for recovery of all crashed or damaged aircraft with the 15 AW safety representative or SIB board president, if applicable, before recovery procedures are initiated. The recovery action starts when directed by the OSC, SIB board president, or safety representative as applicable.
- 3.6.4. Report removal recommendations to the OSC and/or SIB president.
- 3.6.5. After obtaining approval from the OSC or safety representative and confirming Bioenvironmental Engineering has ensured the area is safe for entry configure aircraft and begin recovery/removal actions. Recovery and removal of aircraft and aircraft parts will be IAW AFI 91-204 to ensure preservation of evidence.
- 3.6.6. Rapid removal of aircraft by the CRT will be done in the most expeditious and safe manner practical with input from the OSC. Tenant organizations will provide trained personnel and equipment to recover their aircraft.
- 3.6.7. Obtain verification from the OSC and Explosives Ordinance Disposal representative that all explosive items have been made safe or removed, if applicable.
- 3.7. Designated individuals from the mishap aircraft organization or 15 AMXS/TA, as applicable, will ensure the following ground handling procedures are complied with.
 - 3.7.1. Disconnect batteries.
 - 3.7.2. Drain fuel and oil from tanks if required.
 - 3.7.3. Remove liquid oxygen if required.
- 3.8. When responding to a disabled aircraft with hot brakes and after barrier engagement, the crash recovery team chief will coordinate with the base fire department and/or 15 AMXS/MOCC checklist to ensure the aircraft is in a safe condition before proceeding with removal procedures.
 - 3.8.1. The aircraft will sit for 30 minutes to allow adequate time for brake cool-down. All personnel will approach the aircraft from a forward or aft direction, until the brakes have cooled. No personnel will be allowed to stand in an area within a 45 degree angle and 300 feet to the side of the wheel and tire assemblies.
- 3.9. Crash Recovery operations in difficult to reach areas will be coordinated through the OSC and DCG. Several base resources may be needed to ensure the appropriate equipment and personnel can be taken to the crash site in a timely manner (See OPlan 91-1)
- 3.10. All personnel entering the site will wear proper PPE in accordance with the site safety and health plan. Units are responsible to provide their personnel with proper PPE.

RAYMOND G. TORRES, Colonel, USAF
Commander, 15th Airlift Wing

Attachment 1**MINIMUM CRASH RECOVERY EQUIPMENT LIST****Table A1.1. Checklist 1A: Small Aircraft (F-15) List**

Small Aircraft (F-15) List

(Aircraft less than 75K)

Minimum List (Not limited to)

Changes must be approved through MAJCOM

- | | | |
|-----|------|--|
| 1. | 1 ea | Wheel Skate |
| 2. | 1 ea | Spill Response Kit |
| 3. | 2 ea | Lift chain 4 leg 10 Ton |
| 4. | 2 ea | Airbag 12 Ton |
| 5. | 1 ea | Compressor, MC-7 or equivalent |
| 6. | 2 ea | Airbag, 26 Ton |
| 7. | 4 ea | Control Console |
| 8. | 2 ea | Generator |
| 9. | 1 ea | MDS-Specific Lift Sling (Upon request, location 154 HIANG) |
| 10. | 1 ea | Carbon Fiber Response Kit |
| 11. | 1 ea | Crane in-place Contract |

Notes:

- a) These are minimum requirements, add MDS-specific as required.
- b) Equipment already established at location Hangar 34 may be used if suitable for assigned MDS.
- c) This list should not cause lowered Allowable Source Code requirements.

Assumptions:

- a) Additional time may be required to obtain necessary equipment that is not on the list.
- b) Common equipment (i.e. aircraft jacks, tow bar, -86, light cart, etc.) is not included on this list, but may be required depending on conditions.
- c) Crash recovery vehicles need to be assigned or identified in pre-plan. (i.e. fighter units require dedicated vehicles)
- d) This list does not include ancillaries (i.e. dunnage, hand tools, PPE, consumables).
- e) Depending on total pieces of equipment assigned to unit, they may require kit assignment.

Table A1.2. Checklist 1B: Medium Aircraft (C-37, C-40, C-130) List

Medium Aircraft (C-37, C-40, C-130) List

(Aircraft 75K to 200K)

Minimum List (Not limited to)

Changes must be approved through MAJCOM

1. 4 ea Tethering Kit
2. 2 ea Pull Scale
3. 1 ea Spill Response Kit
4. 2 ea Lift chain 4 leg 10 Ton
5. 3 ea Lift chain 2 leg 10 Ton
6. 8 ea Pull Scale 5 Ton
7. 2 ea Air Compressor MC-7 or equivalent
8. 8 ea Airbag 26 Ton
9. 3 ea Control Console
10. 2 ea Generator
11. 1 ea Carbon Fiber Response Kit
12. 1 ea Crane In/Place Contract

Notes:

- d) These are minimum requirements, add MDS-specific as required.
- e) Equipment already established at location Hangar 34 may be used if suitable for assigned MDS.
- f) This list should not cause lowered Allowable Source Code requirements.

Assumptions:

- f) Additional time may be required to obtain necessary equipment that is not on the list.
- g) Common equipment (i.e. aircraft jacks, tow bar, -86, light cart, etc.) is not included on this list, but may be required depending on conditions.
- h) Crash recovery vehicles need to be assigned or identified in pre-plan. (i.e. fighter units require dedicated vehicles)
- i) This list does not include ancillaries (i.e. dunnage, hand tools, PPE, consumables).
- j) Depending on total pieces of equipment assigned to unit, they may require kit assignment.

Table A1.3. Checklist 1C: Large Aircraft (C-135) List

Large Aircraft (C-135) List

(Aircraft over 200K)

Minimum List (Not limited to)

Changes must be approved through MAJCOM

1. 8 ea Tethering Kit
2. 2 ea Pull Scale/50 Ton
3. 1 ea Spill Response Kit
4. 2 ea Lift Chain 4 leg 10 Ton
5. 3 ea Lift Chain 2 leg 10 Ton
6. 8 ea Pull Scale 5 Ton
7. 2 ea Air Compressor MC-7 or equivalent *
8. 8 ea Airbag 26 Ton
9. 5 ea Control Console
10. 2 ea Generator
11. 2 ea 40 Ton Rhino Jack
12. 1 ea Crane/In-Place Contract

Notes:

- g) These are minimum requirements, add MDS-specific as required.
- h) Equipment already established at location Hangar 34 may be used if suitable for assigned MDS.
- i) This list should not cause lowered Allowable Source Code requirements.

Assumptions:

- k) Additional time may be required to obtain necessary equipment that is not on the list.
- l) Common equipment (i.e. aircraft jacks, tow bar, -86, light cart, etc.) is not included on this list, but may be required depending on conditions.
- m) Crash recovery vehicles need to be assigned or identified in pre-plan. (i.e. fighter units require dedicated vehicles)
- n) This list does not include ancillaries (i.e. dunnage, hand tools, PPE, consumables).
- o) Depending on total pieces of equipment assigned to unit, they may require kit assignment.

Attachment 2

MINIMUM CRASH RECOVERY TEAM POSITIONS AND DUTIES

A2.1. Crash Recovery Supervisor/Team Chief (1 each)

- A2.1.1. Coordinate, lead and direct crash recovery operation
- A2.1.2. Brief safety and scenario situations/concerns
- A2.1.3. Assist agency officials in recovery method determination

A2.2. Inflation Bag Control Console Operator (3 each)

- A2.2.1. Inspect, monitor and operate control console during lifting
- A2.2.2. Direct hose to inflation bag connections during inflation and deflation operation
- A2.2.3. Determine console/compressor placement position
- A2.2.4. Coordinate inflation bag, console and hose placement and removal
- A2.2.5. Assist in cleanup

A2.3. Height Observer (3 each)

- A2.3.1. Monitor actual height progression during lifting process and report progress to team chief/console operator
- A2.3.2. Monitor and coordinate with opposite height observer
- A2.3.3. Assist in equipment placement, removal and area cleanup

A2.4. Equipment Custodian (1 each)

- A2.4.1. Monitor, control and issue all dispatched crash recovery equipment
- A2.4.2. Clean, account and inventory all returned equipment/material
- A2.4.3. Coordinate Flight Kitchen services as required
- A2.4.4. Assist team as needed

A2.5. Equipment Handlers (7 each)

- A2.5.1. Assist in the inflation bag, hose, console and compressor placement
- A2.5.2. Assist in dunnage/cribbing/jack placement
- A2.5.3. During lifting, monitor bag/jack progress
- A2.5.4. Assist in retrieval, return of equipment, area cleanup

Attachment 3

CRASH RELEASE CERTIFICATE

KNOW ALL MEN BY THESE PRESENTS:

That in consideration for the use of United States Air Force equipment and personnel, the receipt of which is hereby acknowledged, I, (1) _____, as agent of (2) _____, agree to release, acquit, and forever discharge the United States, its officers, agents, and employees, for all liability arising out of or connected with the use of United States equipment or personnel for fire control, crash, and rescue activities at or in the vicinity of _____, and I, (1) _____, as agent of (2) _____, further agree, to the full extent permitted by law, to indemnify, defend, and hold harmless the United States, its officers, agents, and employees against any and all claims, of whatever description, arising out of or connected with such use of United States equipment or personnel.

SIGNATURE _____

WITNESSED DATE / SIGNED BY DATE _____

(1) The aircraft owner or operator's authorized representative

(2) The owner's or carrier's name

Attachment 4

AIRCRAFT CRASH SITE HAZARDS OVERVIEW

Aircraft crash sites are inherently dangerous areas that can pose a significant health and safety hazards to unaware and unprotected persons. It is human nature for commanders, responders, and safety investigators to want to enter a crash site as quickly as possible to begin assessing the wreckage. Until a site safety and health plan is developed by the appropriate safety and health professionals, however, only fire fighters performing firefighting and rescue, Explosive Ordnance Disposal technicians disarming explosives, and properly trained hazardous material teams engaged in critical emergency response actions should enter an aircraft crash site.

Many aircraft crash sites will require persons entering the site to be outfitted with personal protective equipment (PPE) until the site is cleaned and restored to unrestricted access. For significantly damaged aircraft with composite material, it may be days or weeks before the site is safe for access without PPE. PPE required to enter an aircraft crash site will often include chemical protective overgarments (Tyvek or similar suits), chemical protective gloves, leather/puncture-resistant gloves, and respirators with appropriate filter and organic vapor cartridges.

Figure A4.1. Typical Chemical Protective Overgarments



Each organization listed in this plan should determine if their personnel will need access to an aircraft crash site in the early days of a mishap response and pre-coordinate appropriate safety and health provisions, including PPE, with Ground Safety (15 AW/SEG) and Bioenvironmental Engineering (15 ADS/SGGB). The table below outlines aircraft crash site recovery teams anticipated to enter an aircraft crash site that may have significant hazards.

Table A4.1. Crash Recovery Teams Functions

Team	Function
Bioenvironmental Engineering Team (ADS)	Identification, measurement of site hazards and environmental sampling
Search and Recovery Team (SVS)	Recovery of remains in crash site
Site Survey Team (CES)	Survey of crash site
Heavy Equipment Operators (CES)	Movement of damaged aircraft parts
Repair and Reclamation (MXS)	Identification/recovery of damaged aircraft parts
Interim Safety Board (SE)	Site investigation

The table below outlines the minimum personal protective equipment each team should have available for team members who may enter a crash site “warm” or “hot” zone. Each of the teams chief’s will need to pre-coordinate a respiratory protection program and “certified” personal protective equipment listing with Bioenvironmental Engineering that is specific to the disaster team and associated with the team’s aircraft crash site functions.

Table A4.2. Minimum PPE Requirements to Enter Crash Site

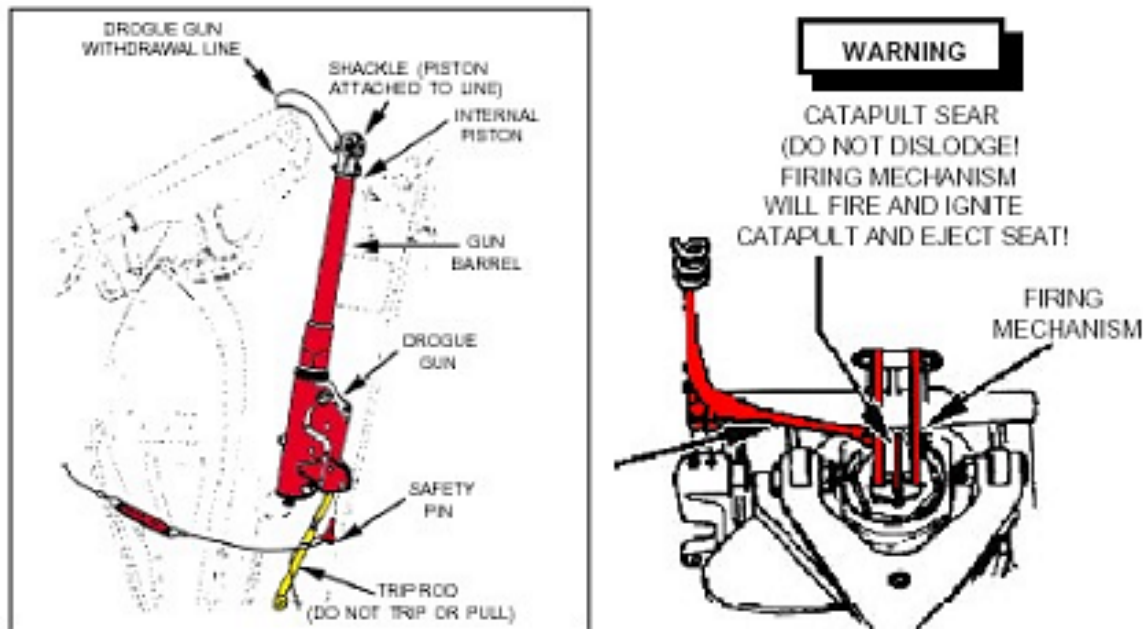
PPE Category	Minimum Team PPE Requirement
Respiratory Protection	Full Face Air-Purify (or Powered Air Purifying Respirators) with Organic Vapor Cartridges/P-100 filters
Chemical, Bloodborne Pathogen Contact Protection	Disposable Nitrile Gloves, Hooded Disposable Chemical Protective Coveralls, Chemical Protective Overboots/Disposable Boot Covers
Cut, puncture protection	Goggles (if respirator not used) Leather gloves, Hard sole/toe boots

The following pages contain a brief overview of aircraft crash site hazards – additional information can be found in T.O. 00-105E-9, *Aerospace Emergency Rescue and Mishap Response Information (Emergency Services)*, and by consulting aircraft maintenance, fire protection, EOD, safety, and health experts.

Flammable, Explosive, and Pyrotechnic Materials:

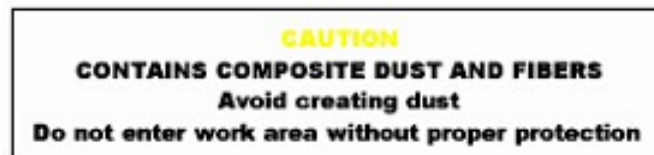
Most aircraft carry flammable, explosive, and/or pyrotechnic devices, including munitions, countermeasure flares, detonation cords and squibs, ejection seat rocket motors, high pressure gas and liquid cylinders, fuel tanks, oxidizer containers, and other similar items. While normally designed for safe operation, items damaged by the impact or fire may explode/ignite spontaneously (or when disturbed) causing burns and shrapnel injuries. These items may need to be recovered or rendered safe by EOD before other recovery teams are allowed into a crash site.

Figure A4.2. Typical Aircraft Pyrotechnic Devices



Composite Materials:

Figure A4.3. Sample Composite Material Hazard Warning Label



Most modern aircraft have structures made from advanced composite materials. In fact all 15 AW assigned aircraft do contain numerous composite materials. (See T.O. 00-105E-9 for aircraft composite material location diagrams). These materials can present significant health and safety hazards when damaged. Burning composite materials can release fibers and toxic combustion by-products that can cause permanent or long-term health effects when inhaled. Until an aircraft fire involving composite material is extinguished and the material cooled to ambient temperature, responders need to assume a significant inhalation hazard may be present and self-contained breathing apparatus is required to prevent lung damage.

Broken composite material or material previously damaged by fire may continue to release fibers, when disturbed by wind or handling, that can permanently damage the lung when inhaled. Broken composite materials can be extremely sharp and splintered, cutting or impaling unprotected persons that inadvertently step on or handle the material. This brittle material can become imbedded in the skin and muscle and break off inside the body, requiring surgical procedures to remove composite fibers.

Figure A4.4. Typical Crash Site Damaged Composite Material



Combustion By-Products:

Even aircraft that do not contain composite material can present a significant hazard from the inhalation of burning or off-gassing fuel, hydraulic fluids, plastics, etc. When burned or heated, these material can release toxic combustion by-products, such as carbon monoxide, phosgene, and hydrogen cyanide. Most fire-related deaths are attributed to inhalation of combustion byproducts, and sub-lethal levels of these chemicals can still cause permanent lung, nervous system, and other systemic damage.

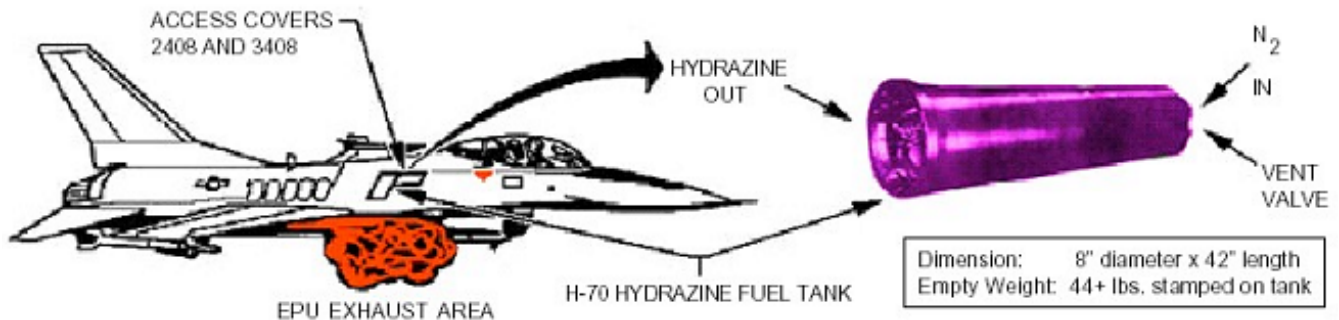
As with composite materials, until an aircraft fire is extinguished and cooled to ambient temperature, responders need to assume a significant inhalation hazard may be present and self-contained breathing apparatus is required.

Hydrazine:

The F-16 aircraft carry an emergency power unit fueled with a hydrazine and water mixture (H-70). Hydrazine is a particularly toxic fuel that can cause immediate injury as well as long-term health effects. It has a chemical composition and odor similar to ammonia. Hydrazine can present an inhalation/contact hazard at the incident site as well as an inhalation hazard for significant distances downwind of a release.

Because of the inhalation health hazard, the standard initial evacuation distance for any F-16 hydrazine incident at Hickam AFB is 600 feet. Hydrazine vapor exposure to eyes can cause itching, burning, and swelling. Inhaled hydrazine vapors can cause irritation of the respiratory tract and lungs and can be absorbed into the bloodstream where it can permanently damage the liver. Skin contact with liquid hydrazine can cause localized burns. Hydrazine is readily absorbed through the skin and into the bloodstream.

Damaged hydrazine tanks can slowly leak hydrazine vapor long after the aircraft crash and initial response are over and may need a qualified hazardous material response team to contain and decontaminate the hydrazine tank. In many cases, the on-scene commander will need to contact the aircraft's home station and request a qualified hydrazine fuels team be sent TDY to properly handle the aircraft fuel system components.

Figure A4.5. F-16 Emergency Power Unit Hydrazine Fuel Tank**Blood Borne Pathogens:**

Blood, body fluids, and body parts of aircraft crash victims can present an infection hazard to unprotected personnel from Hepatitis B, human immunodeficiency virus (HIV), and other contagious diseases. Blood and body fluids containing infectious diseases are primarily a risk to personnel through unprotected skin contact with the material and accidental contamination of clothing. Cuts and scrapes from working around the site and accidental ingestion are avenues for infectious diseases in blood and body fluids to enter the body. Accidental hand contact with mucus membranes, such as the eyes, nose, and mouth, can spread infectious disease causing pathogens.

As in clinical settings, knowledge of the infectious disease risk and “standard precautions” are needed to prevent skin contact and accidental ingestion in order to minimize the chance of infectious disease spread. Typically disposable nitrile or latex gloves will be required for individuals touching blood and body fluids. Protective overgarments (Tyvek or similar) and boots may also be required when significant blood and body fluids may get on the clothing of personnel working in a crash site.

Radioactive Material:

Many aircraft and aircraft stores contain radioactive materials, such as Depleted Uranium, Strontium-90, and Radium-226, that can be damaged and released around a crash site. These materials may present some direct exposure risk from gamma radiation, but primarily present a hazard through contamination and accidental ingestion or inhalation of radioactive material. Radioactive material containing items involved in a fire may release the radioactive material into the air and/or crash site as smoke particles/dust, presenting a readily inhalable form of the radioactive material. Once deposited in the lungs, radioactive material can be absorbed into the body and continue to cause radiation damage, including increased risk of cancer, over the lifetime of the affected person.

Figure A4.6. Typical Depleted Uranium Counterweights

