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**Maintenance**

**CRASH RECOVERY PROGRAM**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This Pope Air Force Base Instruction establishes procedures for the recovery of aircraft involved in a ground or air incident/accident and ensures adequate coverage 24 hours a day, 7 days a week. It will be utilized in conjunction with other agency policies and all applicable Technical Orders (TOs) pertaining to the disabled aircraft. It applies to 43 MXS, 23 MXS, 743 AMXS, and 43 AMXS. **Records Disposition:** Documentation created by this publication will be maintained and disposed of IAW AFMAN 37-123, *Management of Records* and AFMAN 37-139, *Records Disposition Schedule*.

**SUMMARY OF REVISIONS**

**This Instruction has been extensively rewritten and requires complete review.**

**1. Policy:**

- 1.1. The Crash Recovery program is established to recover damaged and disabled aircraft in minimum time consistent with the following considerations:
  - 1.1.1. The requirement to reopen the runway for operational use.
  - 1.1.2. Prevention of unnecessary secondary damage.
  - 1.1.3. Preservation of evidence for accident investigation.
  - 1.1.4. Safety of personnel involved with recovery operation.

**WARNING:**

**Incidents involving aircraft made up of a composite structure may cause serious injury or death to those in contact with it. Transient aircraft home bases should be contacted to determine composite material risks and requirements for personal protective equipment (PPE).**

**CAUTION:**

**The aircraft and crash site will be disturbed only to the extent required to eliminate an imminently dangerous situation to the aircraft, support equipment, and personnel, and will remain in an undisturbed state until the aircraft is released to maintenance by the On Scene Commander (OSC).**

**2. Procedures.**

2.1. The 43 MXS Aero Repair Section Chief and 23 MXS Repair and Reclamation Section Chief will ensure provisions of this instruction are maintained in current status with associated maintenance directives.

2.2. Aero Repair Section will provide Crash Recovery personnel to respond to all in-flight and ground emergencies, 24 hours a day, 7 days a week.

2.3. Upon notification of an in-flight emergency, the Crash Recovery team and owning organization tow team will proceed to the designated holding area. Holding area for runway 05 is on the Silver Ramp; the holding area for runway 23 is located on Papa Row.

2.3.1. The crash recovery team will establish radio contact with the Senior Fire Officer for any further instructions and monitor the fire net while maintaining radio contact with the Maintenance Operations Center (MOC) and applicable production superintendent, keeping them updated on the situation.

2.4. When a disabled aircraft shuts down engines on the runway, Crash Recovery will tow the aircraft clear of the runway. Once Crash Recovery has cleared the aircraft from the runway, the owning organization tow team will provide additional augmentation to the Crash Recovery team to tow the aircraft to its final destination. The owning organization tow team will tow the aircraft to final parking if there is another emergency in progress that requires Crash Recovery response.

2.5. When hot brakes are declared, Crash Recovery will proceed to aircraft when directed by the Senior Fire Officer. Crash Recovery will approach the wheel from either front or rear, depending on aircraft configuration. In accordance with TO 4B-1-1, *Use of Landing Wheel Brakes and Wheels During Ground Operations.*, do not attempt to determine brake temperature using mechanical items such as melt sticks or chemical pencils. Crash Recovery will determine if brakes are hot, safe, or whether the tire should be blown with spike boards. If "hot brakes" are determined, all non-essential personnel will be withdrawn a minimum of 300 feet and a 30-minute cool down period will begin. If at the end of the 30-minute cool down period, the brakes are still hot, an additional 30-minute cool down period will begin until the brakes are determined safe. After a thorough inspection and brakes are determined safe, the aircraft can be moved to another location.

2.6. In the event one or both main/nose tires are blown on the runway, Crash Recovery personnel, when directed by the on-scene Senior Fire Officer, will install new wheel and tire assemblies. When aircraft is deemed safe to tow, Crash Recovery will tow the aircraft clear of the runway.

2.7. Safety precautions will not be abandoned to expedite removal of disabled or damaged aircraft.

**3. Responsibilities.**

3.1. 43 MXS Aero Repair Section will:

- 3.1.1. Provide a qualified Crash Recovery Team Chief for all in-flight and ground emergencies who will direct the recovery operation and coordinate the request for additional support requirements for all C-130 and non-fighter transient and en route aircraft.
  - 3.1.2. Provide initial response checklists (to protect personnel, aircraft or other property from further damage, etc.). See [Attachment 5](#).
  - 3.1.3. Provide telephone numbers/web site references of key personnel and agencies (e.g. TACC, HQ AMC/LGRC, weapon system program managers, local environmental protection response agencies, etc.).
  - 3.1.4. Maintain Crash Damaged and Disabled Aircraft Recovery (CDDAR) response equipment (e.g. snatch cables, tow bars, shoring, hard hats, gloves, shovels, wheel/tire assemblies, etc.) This equipment is stored in the Crash recovery trailers, which are located at the Maintenance Flight location, should they be needed.
  - 3.1.5. Additional equipment (e.g. cranes, dollies, jacks, tow vehicles) will be sourced through 43 MXS AGE, lateral bases or contract sources (e.g. host support, local heavy equipment operators) if needed but we do not possess on base. Procedures for getting additional equipment will vary and be done based on situation, availability and time frame.
  - 3.1.6. Aircraft defuel capabilities and fuel spill clean up procedures are outlined in the applicable aircraft Technical Orders and Pope AFB Hazardous Material Emergency Planning and Response Plan and will be followed respectively.
  - 3.1.7. AR Section Chief will plan and conduct periodic table top exercises to discuss possible responses to a variety of scenarios, assess personnel capabilities, exercise checklists, validity of phone numbers, etc. These exercises will mirror other base major accident response exercises.
  - 3.1.8. Ensure home stations will be prepared to rapidly deploy crash recovery equipment and personnel for their MDS as directed by HQ AMC/LGRC in order to recover AMC assets.
  - 3.1.9. Aero Repair will perform and track inspection, repair, and storage of crash recovery equipment and personal protection gear.
  - 3.1.10. Maintain all special aircraft cribbing equipment, attaching hardware for flight control surfaces, landing gear, doors, and other equipment, e.g. slings, dollies, jigs, etc.
  - 3.1.11. Provide annual crash recovery training to A/R shop personnel and be documented in GO 81.
  - 3.1.12. Provide standby personnel to assist 23 MXS Repair and Reclamation Section with all in-flight and ground emergencies after normal duty hours and weekends.
  - 3.1.13. Ensure compliance with all published safety directives.
- 3.2. 23 MXS Repair and Reclamation Section will:
- 3.2.1. Provide a primary response crash crew, to include a qualified Crash Recovery Team Chief, for all in-flight and ground emergencies who will direct the recovery operation and coordinate the request for additional support requirements for all A-10 and transient fighter aircraft.
  - 3.2.2. Provide annual crash recovery training.

3.2.3. Maintain and inspect all A-10 specific crash equipment (quarterly), i.e. sling, tow bars, air bags, tools, etc.

3.2.4. Provide personnel to assist 43 MXS Aero Repair section with all in-flight and ground emergencies and standby personnel after normal duty hours and on weekends/holidays.

3.2.5. Ensure compliance with all published safety directives.

3.2.6. Maintain the 40-ton crane in a constant state of readiness for use on any aircraft emergency, disabled or damaged aircraft.

3.3. Owing Organization Production Superintendent Will:

3.3.1. Upon notification of an in-flight emergency or a ground emergency that may require towing his/her unit's aircraft, immediately assemble a complete tow team and assign a supervisor (normally the Production Superintendent him/herself or an expeditor) to provide support as directed by the Crash Recovery Team Chief. Direct the tow team to assemble at the applicable holding area.

3.3.2. Provide any additional assistance as requested by the Crash Recovery Team Chief.

3.3.3. Standby to assist the 43 MXS Aero Repair section with all calls concerning in-flight, ground emergency, disabled, and damaged aircraft belonging to the owning organization.

3.4. 743d Aircraft Maintenance Squadron will:

3.4.1. Maintain necessary equipment including tow bar (C-5, C-141, and C-17), U-30 tow vehicle (C-5 and C-17), and snatch rods (C-5) that are required for recovery functions.

3.4.2. As the maintenance and system experts on C-5, C-17, and C-141 aircraft, assist the 43 MXS AR section in identifying logistics support beyond the capabilities of Pope AFB.

3.4.3. Upon notification of an in-flight emergency or a ground emergency that may require towing a transient aircraft, immediately assemble a complete tow team and assign a supervisor to provide support as directed by the Crash Recovery Team Chief. Direct the tow team to assemble at the applicable holding area (See para 2.3.).

3.4.4. Provide any additional assistance as requested by the Crash Recovery Team Chief.

3.5. The MOC will:

3.5.1. Request that the owning organization assemble personnel to assist in the Crash Recovery operation as required.

3.5.2. Dispatch specialist personnel and equipment as requested by Crash Recovery Team Chief

#### 4. Initial Response Requirements.

4.1. The first-responder(s) will be the 43d Civil Engineering Squadron (43 CES) Fire Department. Senior Fire Official will conduct an initial survey to inspect for:

4.1.1. Signs of fire damaged composites.

4.1.2. Presence of loose/airborne fibers and particulate.

4.1.3. Prevailing weather conditions/directions.

- 4.1.4. Degree of site exposed to fire/explosion/impact.
- 4.1.5. Local/proximal equipment/asset damage and danger.
- 4.1.6. Exposed personnel.
- 4.2. 43d Security Forces Squadron (43 SFS) will enforce an initial 2,000-foot clearance zone centered on the burning/smoking mishap site. Restrict personnel and traffic from entering.
  - 4.2.1. Evacuate areas in the vicinity of the mishap site affected by direct and dense fallout from the fire/explosion generated smoke plume, along with easily mobile, critical equipment. Alter/move aircraft and flight operations exposed to the immediate fallout area as soon as safely practical. Restrict all unprotected personnel from assembling downwind of the crash site.
- 4.3. Extinguish fire and cool composites to below 300°F. **Only** firefighters equipped with Self-Contained Breathing Apparatus are authorized within the 2,000-foot clearance zone of a burning/smoking mishap site until the Senior Fire Official declares the area fire safe.
  - 4.3.1. Avoid high-pressure water break-up and dispersal of composite structures.
  - 4.3.2. Do not use helicopters or low flying aircraft to control/suppress the fire. No flight/hovering/taxiing within 500 ft above ground level of the site and 1,000 ft horizontally.
- 4.4. The Senior Fire Official will establish control at the mishap site until fires are extinguished and composites cooled below 300°F. When the mishap scene is deemed fire safe by the Senior Fire Official and Hazardous Material Response Team (HMRT) has contained damaged advanced composite surfaces, the On-Scene Commander (OSC) will assume control. The OSC will ensure all responding personnel within the clearance zone will wear appropriate PPE.
- 4.5. The OSC will consult with the 43d Medical Group Bioenvironmental Engineering (BEE), and determine when to eliminate the 2,000-foot clearance zone and designate the cordoned area. As a guide, the cordoned area will be defined as more than 25 feet away from damaged composite parts, although it may vary depending upon environmental conditions (rain, dry, high winds, remote site, etc.).
- 4.6. 43 SFS will rope/cordon off the mishap area as established by the OSC/BEE and establish a single entry/exit point. Only sufficiently protected individuals are authorized in the immediate mishap site/cordoned area.
- 4.7. The OSC will identify specific aircraft hazards by inspection, consulting with the crew chief, weapons system manager, reference documents, contractor or aircraft specialists. Note composite and other hazardous materials to mishap response personnel.
  - 4.7.1. Access to the crash site to conduct a more thorough survey will be coordinated with the OSC. Ensure appropriate PPE is utilized.

**5. Containment:** All affected agencies must ensure compliance with the following:

- 5.1. 43 CES firefighters will secure burned/mobile composite fragments and loose ash/particulate residue with fire-fighting foam or a fine water mist until a hold-down fixant material can be applied to immobilize the fibers. Initial actions will concentrate on debris containment.
- 5.2. The 43 CES/HMRT and the 43 MXS Crash & Recovery Team (CRT), will deploy to mishap site with a fixant or “hold-down” solution, consisting of either acrylic floor wax and water mixed in a 10:1

water to wax ratio, or Polyacrylic Acid (PAA-Carboset XL-11). The HMRT and CRT will maintain an adequate supply of fixant solution(s) and spray equipment.

5.2.1. Fire must be completely out and the composites cooled to below 300°F (149 °C) before fixant application. Fire fighting equipment will be available during fixant application, and aircraft break-up and recovery.

5.2.2. HMRT/CRT teams will apply (preferably spray) a heavy coating of the fixant solution to all burned composite materials and to areas containing scattered/settled composite debris. Completely coat the material until wet to ensure the particulate fiber/dust is immobilized. Immediately flush/clean fixant-application equipment with a dilute solvent to avoid clogging.

5.3. HMRT will use Soil-Tackifiers (i.e. Polychem, J-Tack, Terra Tack) to hold materials on sand or soil. Solution will be sprayed onto the ground at a rate of 0.5 gal/sq.yd.

5.4. If fixant cannot be used, or further protection is needed, carefully wrap the coated parts and/or material with plastic sheet/film or place in a plastic bag that is minimum of 0.006 inches (6 mils) thick. Seal and secure the damaged materials with tape.

5.4.1. Apply masking tape over the non-fire/crash damaged composite parts/material. These parts/materials may be required for investigative purposes. Place the damaged composite part/material in a plastic bag if possible and label as required. Pad all sharp projections from damaged composite parts to prevent accidental injuries.

5.5. Improved hard surfaces (i.e. concrete, asphalt) will be vacuumed (with electrically protected HEPA vacuums) or washed down with a detergent and water solution. The waste will be collected via plastic or burlap coated trenches or drainage ditches. Sweeping operations will be avoided, as they will disperse the particulate debris.

## **6. Clean-Up and Disposal of Exposed Advanced Composites.**

6.1. Conduct material disposal according to local, state, federal, and international guidelines. BEE will be contacted to assist with cleanup, sampling and turn-in of the advanced composite parts/material that do **not** require accident investigation, evaluation, repair, or are not needed. Samples of the composite material will be provided to 43 CES/CEV for analysis to determine whether or not waste materials are classified as hazardous waste. Ensure the Safety Investigation Board releases the parts before disposal is authorized.

6.2. If possible, a HEPA vacuum will be used to clean up the local area. Ensure composite materials to be disposed of are de-militarized, netted, and double wrapped in plastic for disposal purposes. All crash debris, vacuum bags, coveralls, gloves, and any other contaminated materials will be properly disposed of and labeled appropriately with the following: "Carbon Fiber Debris. Do not incinerate. Do not sell for scrap. Dispose of in approved landfill. Composite Waste." Any required hazard warnings will also be added. BEE will coordinate composite waste disposal through 43 CES/CEOEC.

6.3. For an open terrain mishap area; the surface will be sprayed with a final foam application and plowed under after all necessary/possible material collection actions have been completed.

6.4. If aircraft were subjected to smoke and debris from the mishap, the following will be undertaken:

6.4.1. Vacuum the air intakes with an electrically protected vacuum cleaner.

6.4.2. For internally ingested smoke; visually and electronically (i.e. "sniffer") inspect all compartments for debris and vacuum thoroughly.

6.4.3. Prior to flying, perform electrical checks and engine run-up.

**NOTE:** Operational Risk Management is paramount in all decision-making.

WINFIELD SCOTT III, Brigadier General, USAF  
Commander

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 21-101 *Aerospace Equipment Maintenance Management*

AFI 21-101 AMC Sup 1, *Aerospace Equipment Maintenance Management*.

TO 4B-1-1, *Use of Landing Wheel Brakes and Wheels During Ground Operations*

Applicable aircraft Technical Orders

Pope AFB Hazardous Material Emergency Planning and Response Plan

43 AW Plan 91-202, *Mishap Investigation Response Plan*

***Abbreviations and Acronyms***

**AR**—Aero Repair

**BEE**—Bioenvironmental Engineering

**CDDAR**—Crash Damaged and Disabled Aircraft Recovery

**CRT**—Crash & Recovery Team

**HMRT**—Hazardous Material Response Team

**MOC**—Maintenance Operations Center

**OSC**—On-Scene Commander

**PPE**—Personal Protective Equipment

**TO**—Technical Order

***Terms***

**Disabled aircraft**—An aircraft that cannot or should not be moved using its own motive power, but can be towed using its own serviceable under-carriage.

**Damaged aircraft**—An aircraft that cannot be moved from the runway using its own motive power or by its own under-carriage.

**Owning Organization**—Unit that services and maintains the aircraft under normal circumstances.

**Attachment 2****INDIVIDUAL AIRCRAFT CAPABILITIES**

**A2.1.** Primary POC for personnel, parts, and equipment is the Tanker Airlift Control Center/Logistics Group Readiness Center (TACC/LGRC), Scott AFB IL, DSN: 312-779-1963. LGRC will task home station units with CDDAR recovery efforts beyond host-base capabilities upon notification. (See **Attachment 3** for local capabilities matrix)

A2.1.1. KC-10: POC McGuire AFB NJ R&R Shop Crash Recovery, DSN: 650-6133

A2.1.2. C-17: POC Charleston AFB SC R&R Shop Crash Recovery, DSN: 673-7054/7055

A2.1.3. C-5: POC Dover AFB NJ R&R Shop Crash Recovery, DSN: 445-5713

A2.1.4. C-141: POC McGuire AFB NJ R&R Shop Crash Recovery, DSN: 650-6133

A2.1.5. KC-135: POC Fairchild AFB WA R&R Shop Crash Recovery, DSN: 657-5653

A2.1.6. 43d CES Hazardous Material Response Team, DSN: 424-2561 Cell: 910-286-4464

A2.1.7. 43d BEE Bioenvironmental Engineering Team DSN: 424-2927 Pager: 910-433-8972

**A2.2.** For AMC commercial contract aircraft, any accident/incident must be immediately reported to Tanker Airlift Control Center, Action Cell, Scott AFB IL, DSN: 779-1705/1706 IAW 49 CFR Part 830.

## Attachment 3

## 43 MXS/743 AMXS CDDAR CAPABILITY MATRIX

	Overall Crash Handling	Blown Tires	Departing Surfaces	Gear Collapse	Major Fuel Spill	Tow	Jack	Brake Change
C-5	3bde	1	3be	3bde	1f	1	2ce	2d
C-141	3bde	2	3be	3bde	1f	1	2ce	2d
C-17	3bde	1	3be	3bde	1f	1	2ce	2d
KC-10	4bdeg	4bdeg	4beg	4bdeg	1f	2be	4bcde	4bdeg
KC-135	4bdeg	4bdeg	4beg	4bdeg	1f	2be	4bcde	4bdeg
COMM	4bdeg	4bdeg	4beg	4bdeg	1f	4bde	4bcde	4bdeg
C-130	1	1	1	1	1	1	1	1

**Capability Key**

1. Full Capability
2. Basic Capability, Minimal Assistance
3. Severely Limited Capability
4. MRT

**Limiting Factors**

- a. Manpower
- b. Equipment
- c. Facilities
- d. Parts
- e. Training
- f. Wing
- g. Tech Data

**Attachment 4****TOW EQUIPMENT**

C-130 Tow Bar (2 each)	743d AMXS/ 43 MXS AR Shop
C-141 Tow Bar	743d AMXS
C-5 Tow Bar	743d AMXS /Yellow ramp
C-17 Tow Bar	743d AMXS
KC-135 Tow Bar (Universal tow bar)	(AR)
KC-10 Tow Bar (C-17 Tow Bar)	743d AMXS
C-17/C-5 Tow Bridle	743d AMXS /CTK Bay
MB-2 Tow Vehicle	43 MXS AR Shop
U-30 Tow Vehicle (2 each)	743d AMXS
MB-4 Tow Vehicle	743d AMXS
MB-4 Tow Vehicle	23 MXS RR Shop
Crane 40 Ton	23 MXS RR Shop

**REMARKS:**

Each crash accident must be evaluated individually, and any list cannot address every CDDAR scenario.

HQ AMC/LGRC will utilize MRTs for CDDAR of AMC assets where En route capability is limited or does not exist.

HQ AMC/LGRC will coordinate with weapon system functional managers to determine MRT composition and equipment requirements.

**Attachment 5****INITIAL CRASH RESPONSE CHECKLIST**

**A5.1.** Upon notification of the crash from the SECONDARY CRASH NET, FIRE CHIEF or MAINTENANCE SUPERVISION immediately survey crash location

- A5.1.1. Terrain and soil conditions (if applicable)
- A5.1.2. Grid maps to determine best route to site
- A5.1.3. Weather conditions
- A5.1.4. Respond to site once instructed

**A5.2.** A minimum of one person shall remain at the shop to recall necessary team members, shop chief, notify transportation if additional vehicles or Crash Tractor drivers are required and to coordinate with the crash site (ISO and 43<sup>rd</sup> Maintenance personnel may be recruited if necessary)

**A5.3.** Crash Tractor will not immediately respond unless told to do so by On-Scene Commander, MXG Commander, Maintenance Supervisor or NCOIC of the shop

- A5.3.1. Report to the On-Scene Commander and await instructions at the Entry Control Point
- A5.3.2. An ECP will be established by Aero Repair personnel if the first ones to arrive
- A5.3.3. May be tasked by On-Scene Commander to provide security until the Security Police arrive

**A5.4.** On-Scene Commander is the only POC and will direct anything you request, need, want in addition to the equipment or personnel needed

**A5.5.** On-Scene Commander will release the aircraft to the Crash Team Chief for recovery operations

***NOTE: SAFETY IS THE MOST IMPORTANT THING IN RECOVERY OPERATIONS***

**A5.6.** Some hazards to remember are:

- A5.6.1. Ejections seats
- A5.6.2. Batteries (shock hazard)
- A5.6.3. Hydrazine
- A5.6.4. Oxygen bottles
- A5.6.5. Ammunition, missiles, bombs, etc.
- A5.6.6. Struts (compressed air)
- A5.6.7. Fuel/Hydraulic Fluid
- A5.6.8. Tires (compressed air)

**A5.7.** Team Crash Chief will brief personnel on recovery plan, safety and hazards, introduce lead techs, and assign each member their duties prior to recovery operations