

17 JUNE 2003



Safety

**FOREIGN OBJECT DAMAGE PREVENTION
AND REPORTING**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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(CMSgt Randal McGee)
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This Fighter Wing Instruction (FWI) implements AFDPO 91-2, *Safety Programs*. It establishes responsibility and procedures for eliminating Foreign Object Damage (FOD) to aircraft and aircraft engines by identifying and eliminating potential hazardous situations which, if not corrected, can cause damage. This instruction applies to all 926th FW assigned or attached personnel who work in, around or traveling through areas where aircraft are maintained and operated.

SUMMARY OF REVISIONS

This revision changes group and office symbols due to the Maintenance Group reorganization. It is advised to read this instruction thoroughly to review changes implemented. A bar (|) indicates revisions from the previous edition.

1. Responsibilities . Commanders, maintenance supervisors, aircrew members, unit support personnel and personnel assigned to the 926th Fighter Wing working in, around or traveling through areas where aircraft are maintained/operated share the responsibility for FOD prevention and compliance with this instruction. Personnel who are permitted entry to the flight line and ramp area must become familiar with the contents of AFI 21-101, *Aerospace Equipment Maintenance Management*; AFI 91-202, *The U.S. Air Force Mishap Prevention Program*; and *AFI 91-204, *Safety Investigations And Reports*. Contract maintenance personnel working on or near the flight line or taxiways are given a FOD briefing by Civil Engineer management. The personal integrity of maintenance personnel is the basis for all maintenance. Individuals involved in work on aircraft, engines, aerospace ground equipment and components must personally take aggressive action to continuously inventory tools and police the area whenever working on or near engines or aircraft.

2. FOD Awareness Program. The FOD Awareness Program is administered by the Maintenance Group (MXG)/CC FOD Prevention Manager and FOD Prevention Noncommissioned Officers (NCO) from every section.

2.1. The MXG FOD Prevention Manager conducts FOD meetings at least quarterly in accordance with AFI 21-101. These meetings cover prevention as well as a review of incidents. The meeting is scheduled in conjunction with the Combined Safety Quarterly Briefings. Furthermore, FOD issues are addressed daily at the AMX production meeting as required.

2.2. Aircraft maintenance sections appoint a FOD prevention NCO (recommended E-6 or above). Monitors are appointed by individual work centers if deemed necessary. FOD prevention monitors comply with their applicable portions of AFI 21-101, its supplements, and this instruction.

2.3. Work center supervisors indoctrinate all assigned personnel on the importance of the FOD prevention program to the US Air Force mission, in terms of both flying safety and wasted repair costs, and ensures compliance with AFI 21-101.

2.4. Newly assigned personnel must attend FOD prevention training within 30 days of assignment to the organization. Personnel are trained on FOD prevention as outlined in AFI 21-101 and applicable supplements. Individual work centers provide this training. Subject matter discussed includes FOD prevention practices applicable to their individual areas of responsibility.

2.5. A FOD area for information is maintained in each work center. The location should afford the greatest possible access to squadron personnel. The FOD OIC/NCOIC is responsible for posting updated information for the following:

- 2.5.1. Each Maintenance Work Center
- 2.5.2. Operations Squadron
- 2.5.3. Civil Engineer Squadron
- 2.5.4. Security Police Flight
- 2.5.5. Supply Fuels Management Flight

3. Procedures:

3.1. All work centers establish procedures in accordance with existing directives to ensure:

3.1.1. Maintenance personnel account for and properly dispose of all work order residue after maintenance on aircraft, engines and components.

3.1.1.1. All foreign objects (FO) discovered or created are placed in the FO container, and then emptied at the earliest possible time.

3.1.1.2. FO containers are not utilized for anything other than their intended use.

3.2. An inventory of the composite tool kit (CTK) is accomplished at the time of checkout and upon completion of a job or working period. CTK inventories will be performed before leaving aircraft vicinity or job site. Any CTK used during REDBALL maintenance will have a full inventory before engine start and TAXI out. All CTKs are inventoried before turn-in by the tool room/CTK monitor. If the CTK/tool room monitor is the individual who originally checked out the CTK, then a different person must inventory and turn-in CTK. If a tool is lost, personnel notify their supervisor immediately. The supervisor complies with Lost Tool Procedures IAW AFI 21-101. CTKs must be free of FO.

- 3.2.1. CTKs are not normally passed from one individual to another at the job site. If a transfer of control at the job site becomes necessary, a complete inventory is accomplished by the two personnel involved and the CTK signed over to the receiving individual on an AF Form 1297, **Temporary Issue Receipt**.
- 3.3. Engines are not started before accounting for every tool used in the vicinity.
- 3.4. Do not place items such as aircraft forms, watches, or tools, in the intake areas of any aircraft.
- 3.5. Jewelry and personal items: Necklaces, earrings, etc., including hair-restraining devices containing metal must not be worn on the flightline. Watches may be worn on the flight line, but must be removed before performing maintenance on aircraft.
- 3.5.1. Personal electronic communication devices are considered a FOD and general safety hazard around aircraft. As a result, personal cell phones, beepers, pagers, and other personal electronic communication devices are not authorized on the flight line, hangar bays, or aircraft wash rack areas.
- 3.5.2. Personnel using wing sanctioned cell phones are allowed to bring them on the flight line but are encouraged to keep them in their vehicles. Do not use cellular devices within 50 feet of any aircraft. For example: If an individual is around an aircraft and receives a call, that individual must be clear of the aircraft, wash rack, or hangar bay by 50 feet before taking the call (Cell phones are passive until answered.).
- 3.5.3. In addition to the flight line and hangar areas, personal cell phones, beepers, pagers and other electronic communication devices will not be brought into the Munitions Storage Area.
- 3.5.4. Headgear may be worn on the flight line. No headgear is allowed within 50 feet of an aircraft operating an engine. Headgear is also not worn when engines are running on the flight line and wind gusts exceed 20 knots, without restraint systems (chin-straps or ear protector with a band worn over a hat).
- 3.5.5. Headgear must be free of all metal and/or removable objects.
- 3.6. Cockpit Maintenance: Before entering cockpit, personnel must empty all pockets. Only items necessary for maintenance are taken into cockpits. After maintenance is completed in the cockpit area, the individual doing the work performs a thorough check of the entire cockpit for FO. The technician then enters and signs the Tool and FOD check as complied with, in the AFTO Form 781A, **Maintenance Discrepancy and Work Document**, block of the aircraft forms after the maintenance is complete.
- 3.7. All personnel are periodically cautioned and personally briefed by each work center supervisor on the dangers of the engine air inlet section.
- 3.8. Inlet and exhaust covers are utilized when aircraft are in maintenance hangers.
- 3.9. When working on the aircraft or engine, all openings into which items can fall or drop will be plugged or covered.
- 3.10. Parts bags will be used for all hardware (screws, bolts, nuts, washers, clamps, etc.) removed from aircraft. Parts bags will be secured in a readily visible location on the aircraft or in a designated location such as Tail Number Bin (TNB). The parts bags will clearly identify the aircraft tail number and description of contents.

3.11. The work area is policed for FO as soon as each job is completed and/or at any time an item (no matter how small) is dropped.

3.12. The **Red X** requirements for work performed in and around intake ducts as specified by T.O. 00-20-1, *Aerospace Equipment, Maintenance Inspection, Documentation, Policies, and Procedures*, are thoroughly and strictly adhered to with engines installed or not installed.

3.12.1. All required intake inspections before and after maintenance/engine runs are annotated with a **Red X** in the AFTO 781A.

3.12.2. The following procedures are adhered to when FOD is suspected in an aircraft engine.

3.12.2.1. Form entries are made on all inspections.

3.12.2.2. An extensive inspection of all areas ahead of the intake and engine is conducted to determine what caused the new damage.

3.12.2.3. Personnel inspect the compressor fan blades and stator blades through the inlets, using a boroscope.

3.13. Exercise increased emphasis and awareness concerning FOD prevention during surges and other special exercises requiring the fast turnaround of aircraft.

3.14. Install engine intake and exhaust covers at all times when aircraft are parked on the flight line. During engine runs and before aircraft taxiing, stow all aircraft covers inside, secure to crew chief's bag, or remove from the run up area.

3.15. Policing of Areas:

3.15.1. A thorough policing for FO in the vicinity of the aircraft, trim pad or test cell is conducted before each engine operation is initiated.

3.15.2. To prevent possible entrance of foreign materials into aircraft engines, flight line supervisors ensure all aircraft parking areas are thoroughly policed daily. Sweeper Vehicles will be utilized on a weekly schedule. Special emphasis is given small stones, loose tar and other accumulations in expansion seams and ground point cavities.

3.15.3. When personnel discover a large amount of FO on the flight line, they report it to the responsible supervisor. The supervisor notifies the flight line maintenance supervisor who requests sweeping equipment, as required.

3.15.4. When ramp or taxi areas are discovered in need of immediate temporary repair, notify base/civil engineer (extension 3735).

3.15.5. If the area is a potential FO or safety hazard, use red marker cones to identify the hazard. At night, place a yellow blinking light(s) near the cones.

3.16. FOD Walk Procedures:

3.16.1. The OIC/NCOIC or the senior officer/NCO takes charge of the FO walk and ensures all personnel are spaced equally across the ramp. Personnel are spaced not more than 15 feet apart. Spacing is maintained throughout the FO walk and personnel walk down the pavement expansion cracks to ensure a thorough FO walk.

3.16.2. After first sweep, deposit all FO and standby until dismissed.

3.16.3. If the OIC/NCOIC is satisfied the FO walk was successfully and properly policed, all FO from the area covered, the troops are dismissed. If the OIC/NCOIC is not satisfied, an additional FO walk is directed.

3.16.4. Monthly FO walks are conducted on all aircraft parking areas.

3.16.4.1. Personnel of the MXM conduct walks, as a minimum, in the restricted area once a month. Reference Attachment 3 of this instruction for zoned areas of responsibility.

3.17. End of runway (EOR) procedures: The EOR supervisor ensures the ARM/DEARM area is thoroughly policed prior to the first launch/recovery and then prior to each subsequent launch/recovery.

3.18. All maintenance vehicles (pickups, metros, tractors, tugs, etc.) must have a FO container installed and properly secured. Each operator inspects his vehicle before and upon completion of use, for potential FO. All containers are emptied at the beginning and end of each shift, or when full.

3.19. Magnetic Bars are installed on selected vehicles frequently driven on the flight line. These vehicles are the X-Ray truck, Ramp Sweeper, and Aircraft Tow Vehicles (3 ea.).

3.19.1. Magnetic bars mounted on vehicles are cleaned during the vehicles' daily inspections, at shift change, and as required. Magnetic bars are removed from vehicles before vehicles are turned into vehicle maintenance for repair.

3.20. Reporting Procedures:

3.20.1. When hardware, such as a bolt, screw, or nut, is discovered missing from any portion of the aircraft forward of the intake and cannot be found, or when tools or other objects are lost or suspected lost in an aircraft, the aircraft forms must reflect a **Red X** condition. If a tool is lost, X-ray must initiate an AFRC Form 174, **Lost Tool/Object Report**. In this situation, procedures outlined in AFI 21-101 and applicable supplements must be complied with.

3.20.2. When FOD or suspected FOD is discovered, the person discovering it immediately notifies their supervisor. The supervisor notifies Maintenance Operation Center (MOC) at the earliest possible time and MOC notifies QA and Safety.

3.20.3. Whenever a bird strike occurs, the following procedures are to be performed as a minimum:

3.20.3.1. Document the aircraft's AFTO Form 781A on a **RED X** and notify MOC and Quality Assurance.

3.20.3.2. If the bird strike is in the engine, dispatch Propulsion Flight (MXMP) to borescope the applicable engine.

3.20.3.3. If the bird strike is anywhere other than the engines, dispatch Structural Maintenance (MXMFS) to inspect and/or repair damage, if required.

3.20.4. If there are unusual circumstances surrounding the FOD incident (sabotage, FOD which causes an accident or flying incident, etc.), notify MOC regardless of time of day.

3.21. FOD investigations are conducted in accordance with AFI 21-101.

3.22. Airframe/Cockpit Searches:

3.22.1. Whenever an item on an aircraft is lost or suspected lost, the following procedures are performed as a minimum:

- 3.22.1.1. The aircraft's AFTO Form 781A is documented on a **Red X** and MOC is notified.
- 3.22.1.2. An initial search, up to a maximum of two hours, is conducted to find the FO, before impoundment.
- 3.22.1.3. If an item is found within the two-hour limit, notify MOC and clear the **Red X** in the AFTO Form 781A.
- 3.22.1.4. If the FO is not found after the two-hour limit, MOC notifies MXQ to initiate impoundment procedures. After the aircraft is impounded, the impoundment official complies with the impoundment procedures in 926 FWI 21-102, *Impoundment of Aircraft*, and the following:
 - 3.22.1.4.1. Refer to the search matrix to determine the minimum type of FO search required.
 - 3.22.1.4.2. Ensure two seven level FO searches are conducted and documented in the AFTO 781As, unless the FO is recovered.

4. Matrix:

- 4.1. Known FO: Hardware, pens, pencils, knobs, lenses, clamps, binder rings, etc., or any item known lost or dropped in cockpits, bays or panels.
 - 4.1.1. Cockpit: If FO is not recovered by raising the seat to the maintenance position, then seat, floor/fairing panels and console boxes are removed.
 - 4.1.2. Airframe: Remove components from affected area and possible migration paths.
- 4.2. Suspected FO: Items discovered missing. These items could have been removed and not documented, or never installed. Some examples of such items are clamps, screws, and lenses.
 - 4.2.1. Cockpit: If FO is not recovered raise or remove the seat. The impoundment official dictates the scope of the search.
 - 4.2.2. Airframe: If FO is not recovered, remove components from the affected area and possible migration path. Impoundment official dictates the scope of the search.
- 4.3. FO is unknown origin: Hardware recovered from cockpit, panels and bays whose point of origin is unknown.
 - 4.3.1. Cockpit and Airframe: A determined attempt to identify hardware and its point of origin is made. Impoundment official dictates the scope of the search. **NOTE:** These procedures are not inclusive of all FO possibilities. Impoundment officials must use sound judgment when gray areas are encountered.

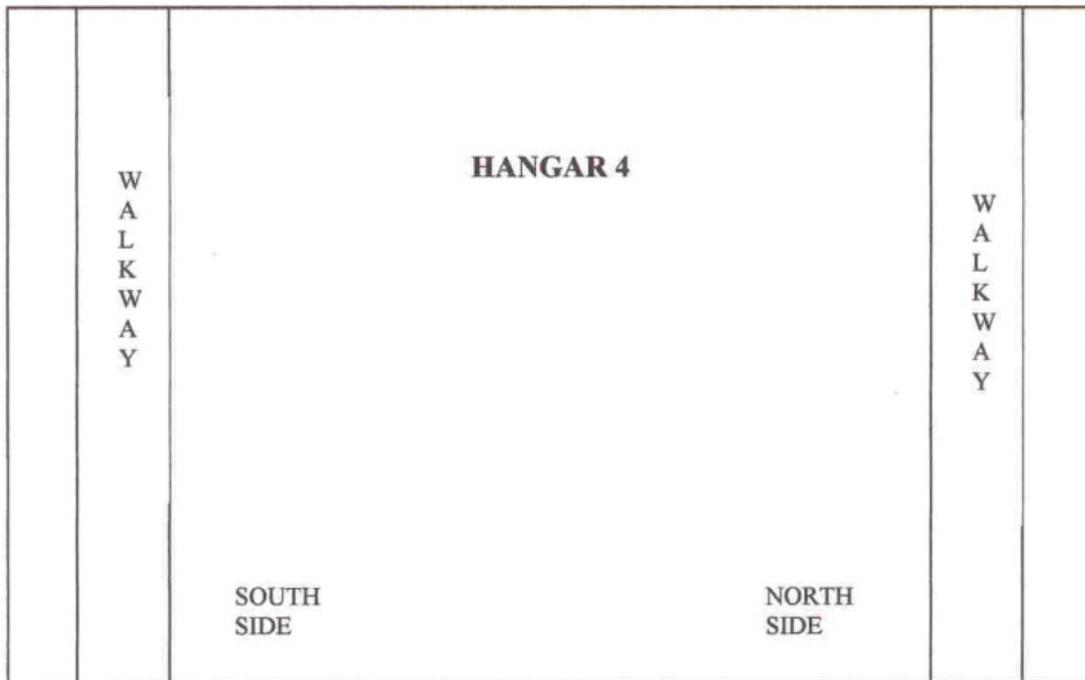
5. Adopted Forms: AF Form 1297; AFTO Form 781A; AFRC Form 174.

RANDALL G. FALCON, Colonel, USAFR
Commander

Attachment 1

DESIGNATED CLEANING AREAS, HANGAR 4

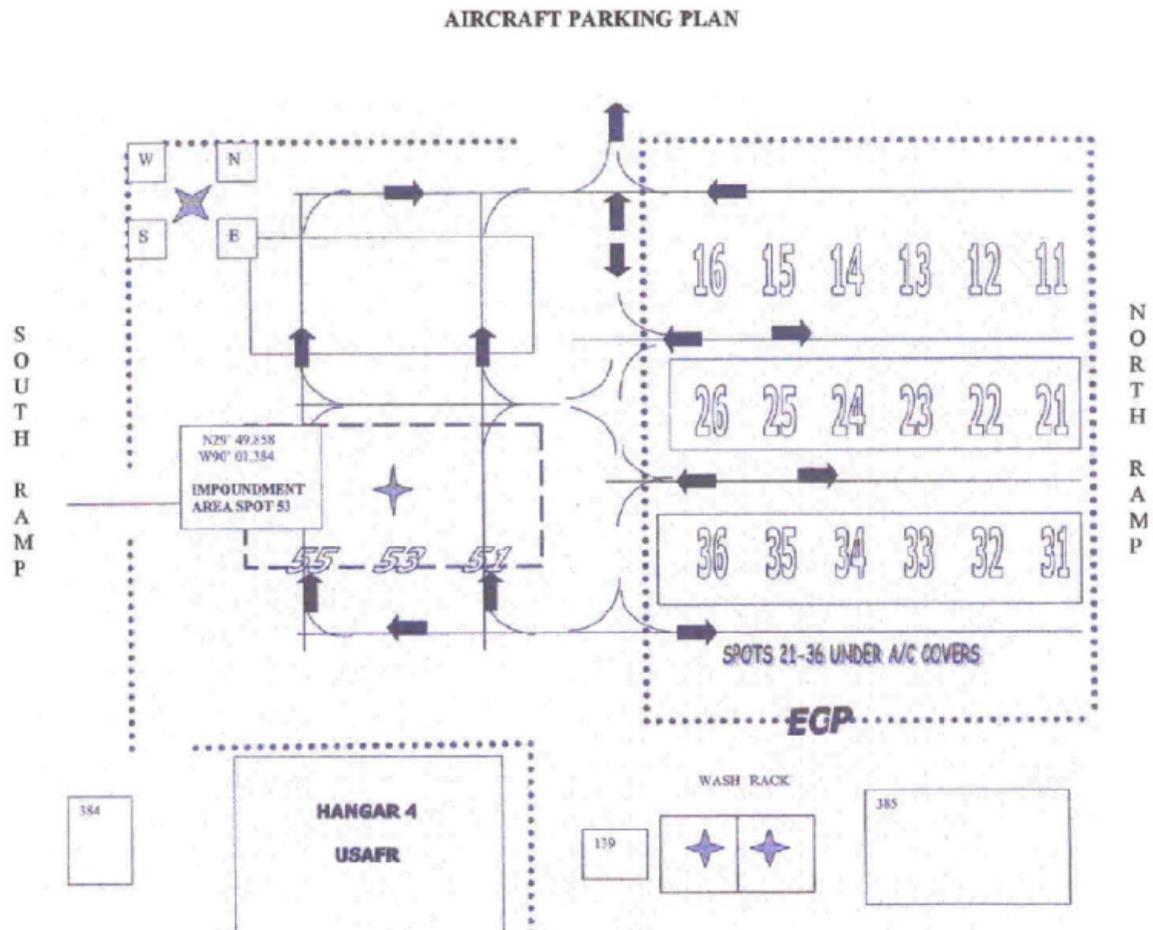
DESIGNATED CLEANING AREAS FOR HANGAR 4



1. HANGAR FLOORS WILL BE SWEEPED AT A MINIMUM ONCE A WEEK: FRIDAY AT 1300 HRS. THIS WILL BE A JOINT EFFORT BY ALL MXM SECTIONS.
2. F.O. CONTAINERS ARE EMPTIED TWICE A WEEK, OR AS REQUIRED.
3. WALKWAYS SHOULD BE KEPT CLEAR OF ALL OBJECTS (BIKES, TOOL BOXES, ETC.)

Attachment 2

AIRCRAFT PARKING PLAN



1. ALL PERSONNEL WILL LINE UP ON THE NORTH RAMP AREA, FACE SOUTH, AND EACH PERSON WILL TAKE A BLOCK FOR THE F.O.D. WALK HEADING TOWARD THE SOUTH RAMP.
2. DESIGNATED AREAS OF RESPONSIBILITY ARE ALL AREAS INSIDE THE FLIGHTLINE ECP AND IN FRONT OF THE NORTH END OF THE HANGAR.

Attachment 3**AREA OF RESPONSIBILITY**

- A3.1.** FLIGHT LINE SUPERVISOR: Trim pad, aircraft parking ramp, to include wash rack, AMX exterior of Building 385.
- A3.2.** AGE SUPERVISOR: Shop interior, ramp space in front of AGE building and FO walk downs, as required. See Attachments 1 and 2.
- A3.3.** JEIM SUPERVISOR: Jet shop interior, Building 385, test cell and FO walk downs, as required. See Attachments 1 and 2.
- A3.4.** MUNITIONS STORAGE SUPERVISOR: Storage area, munitions handling equipment, primary and secondary delivery routes.
- A3.5.** MUNITIONS LOADING SUPERVISOR: Parking areas surrounding building 265, bomb loading equipment and FO walk downs, as required.
- A3.6.** WEAPONS RELEASE/GUN SERVICES SUPERVISOR: Building 265, interior and FO walk downs, as required.
- A3.7.** FUELS SYSTEM SUPERVISOR: Fuel cell and taxiway entrance to fuel cell and FO walk downs, as required. See Attachments 1 and 2.
- A3.8.** AVIONICS SUPERVISOR: ECM building and building 386, interior/exterior and FO walk downs, as required. See Attachments 1 and 2.
- A3.9.** MAINTENANCE SECTION: Shop interior/exterior and assist in hangar cleanup and FO walk downs, as required. See Attachments 1 and 2.
- A3.10.** EGRESS SHOP: Shop interior, Building 385, and FO walk downs, as required. See Attachments 1 and 2.

Attachment 4**FOD PREVENTION INSPECTION CHECKSHEET FOR SUPERVISORS**

- A4.1.** Check cleanliness and condition of pavement around working area.
 - A4.1.1. Pavement cracks
 - A4.1.2. Expansion joints
- A4.2.** Are personnel doing a good job picking up debris?
- A4.3.** Are enough FO containers available and are they periodically emptied?
- A4.4.** Are work areas clean - housekeeping, in general, above average?
- A4.5.** Are component lines (e.g., hydraulic, air oil) plugged when disconnected?
- A4.6.** Are test cell and high power engine run-up areas clean and FO free?
- A4.7.** Continuously observe technicians for good FO prevention habits.
- A4.8.** Spot check technicians during intake and exhaust inspections for loose personal items, etc.
- A4.9.** Do technicians use tech data?
- A4.10.** Are all tools accounted for IAW AFI 21-101 and applicable supplements?
- A4.11.** Is test equipment positioned/handled properly during maintenance?
- A4.12.** Are technicians reporting FO and potential FOD?
- A4.13.** Is clean-up time made available at the end of each shift?
- A4.14.** Are technicians initially trained in the FOD prevention program? Is it documented in CAMS?
- A4.15.** Are bits and pieces (e.g., nuts, bolts, cotter pins) accounted for by using parts/FO bags?
- A4.16.** Do technicians understand the objective of the FOD prevention program?