


P 2.5 FOD prevention programme

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U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular


Subject: Airport Foreign Object Debris (FOD) Management	Date: 9/30/2010 Initiated by: AAS-100	AC No: 150/5210-24 Change:
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- PURPOSE.** This advisory circular (AC) provides guidance for developing and managing an airport foreign object debris (FOD) program. In addition, this AC provides specifications for the equipment used in FOD removal operations.
- SCOPE.** The program described herein is composed of four main areas: prevention; detection; removal; and evaluation. Each of the four areas (corresponding to a dedicated chapter in this AC) contains strategies and practices that can help reduce FOD at airports.

The guidance in this AC is particularly applicable to airport owners and operators, air carrier station managers, and general aviation operators. Individuals in these positions may then be able to communicate to apron crews, maintenance technicians, and aircraft servicing personnel the safety hazards posed by FOD.

The FOD management guidelines presented in this AC are advisory and can be implemented at the discretion of the airport operator in accordance with the airport operator's approved Airport Certification Manual.
- CANCELLATION.** AC 150/5380-5B, Debris Hazards at Civil Airports, dated 7/5/96, is canceled.
- APPLICATION.** The Federal Aviation Administration (FAA) recommends the guidance and specifications in this Advisory Circular for developing and managing an airport FOD management program. In general, use of this AC is not mandatory. However, use of this AC is mandatory for the acquisition of FOD removal equipment through the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and Assurance No. 9, Standards and Specifications.





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Advisory Circular

Subject: Airport Foreign Object Debris (FOD) Detection Equipment	Date: 09/30/2009 Initiated by: AAS-100	AC No: 150/5220-24 Change:
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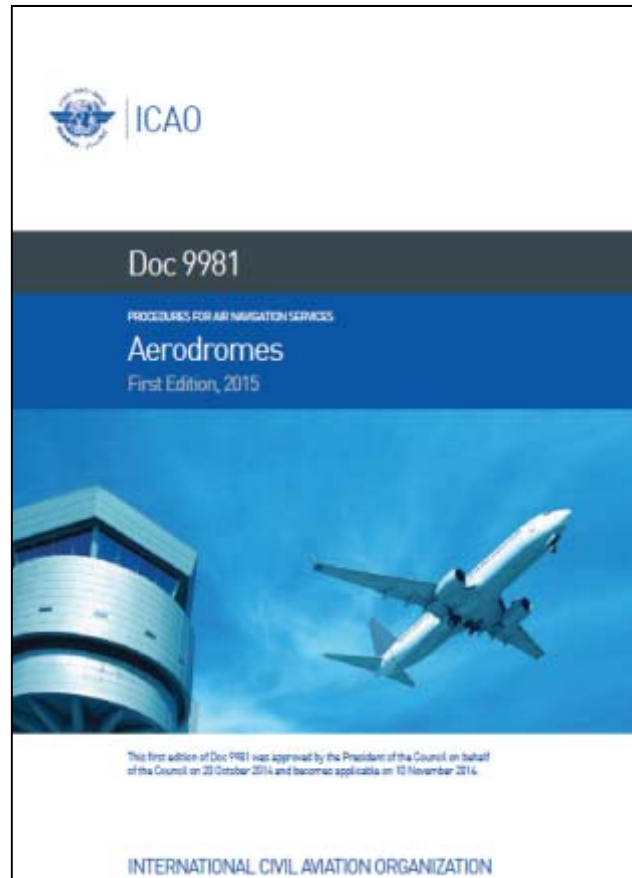
- PURPOSE.** This advisory circular (AC) provides information that airports can use to procure foreign object debris (FOD) detection equipment.
- SCOPE.** This AC contains minimum performance specifications for systems and equipment that detect foreign objects on airports. Four types of detection systems are discussed, including: stationary radar; stationary electro-optical; stationary hybrid radar and electro-optical; and mobile radar.

This AC is based on research conducted by the Federal Aviation Administration's (FAA's) Airport Technology Research and Development Program and Center of Excellence in Airport Technology (CEAT) to examine the performance of several new FOD detection technologies.
- APPLICATION.** The FAA recommends the guidance and specifications in this Advisory Circular for procuring airport FOD detection equipment. In general, use of this AC is not mandatory. However, it is mandatory for all FOD detection equipment acquired through the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and Assurance No. 9, Standards and Specifications.
- COMMENTS OR SUGGESTIONS** for improvements to this AC should be sent to:

Manager, Airport Engineering Division (AAS-100)
ATTN: FOD ENGINEER
Federal Aviation Administration
800 Independence Avenue SW
Washington DC 20591


Michael J. O'Donnell
Director of Airport Safety and Standards

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CHAPTER 5 FOREIGN OBJECT DEBRIS (FOD) CONTROL

5.1 GENERAL

5.1.1 The presence of FOD on the movement area may pose a significant threat to the safety of aircraft operations. FOD has the potential to damage aircraft during critical phases of flight, which can lead to catastrophic loss of life and airframe, and increased maintenance and operating costs. FOD hazards can be reduced through the implementation of a FOD control programme, which would normally include FOD prevention, detection, removal and evaluation.

5.1.2 It is important that all personnel with access to the movement area understand their role in the prevention of FOD. FOD control is normally a module of the initial training given to personnel with access to the movement area.

5.1.3 It is necessary to have a process to regularly clear the movement area of FOD. Removing FOD is the responsibility of everyone.

5.1.4 FOD may be controlled by ensuring that all personnel with movement area access, in particular inspection and maintenance personnel and ground handlers are aware of situations which may potentially cause FOD.

5.2 OBJECTIVES

5.2.1 Aerodrome operators shall establish a FOD control programme commensurate with the identified risks and appropriate to the local operating conditions. The programme shall consist of prevention, detection, removal and evaluation.

5.2.2 FOD prevention shall include awareness, training and education as well as measures for FOD prevention.

5.2.3 The detection of FOD shall include methods for the monitoring and inspection of the movement area.

5.2.4 Operational procedures and, where applicable, equipment shall be provided for the removal, containment and disposal of FOD from the movement area.

5.2.5 Data and information about FOD shall be collected and analysed regularly to identify sources and assess trends.

5.3 OPERATIONAL PRACTICES

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Awareness & Safety Culture
(WHAT it is & What do I do?, Training)

Detection and Prevention
(WHERE they are or can come from?, Inspection)

Incident Analysis
(WHY did it happened?, Specific Report)

Safety Actions
(HOW and WHO is going to fix it, Action Plan)

Continuous Awareness
(WHEN You see it, Campaigns)

Follow Up
(WHEN and HOW MUCH?, Safety Indicators)



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	FAA	EASA
FOD Program specifications	Detailed in a specific AC. Including its elements, requirements and main characteristics	Brief mention in the legislation. Included in the SMS
FOD Manager	Defined roles in the legislation (AC)	Figure not included in the legislation
FOD removal operations	Detailed in a specific AC. Including its elements and requirements	No specific requirements in legislation. International practices
Equipment specifications	Detailed technical specifications in legislation. A specific AC	No specific requirements in legislation or additional material
Training	Particularized requirements in legislation	Standard training for ensuring safety and specific programs in the airports.

FOD prevention programme



**NATIONAL TECHNICAL INSTRUCTION
FOD CONTROL PROGRAMME**

FOD CONTROL POLICY

FOD CONTROL MANAGER

FOD CONTROL COMMITTEE

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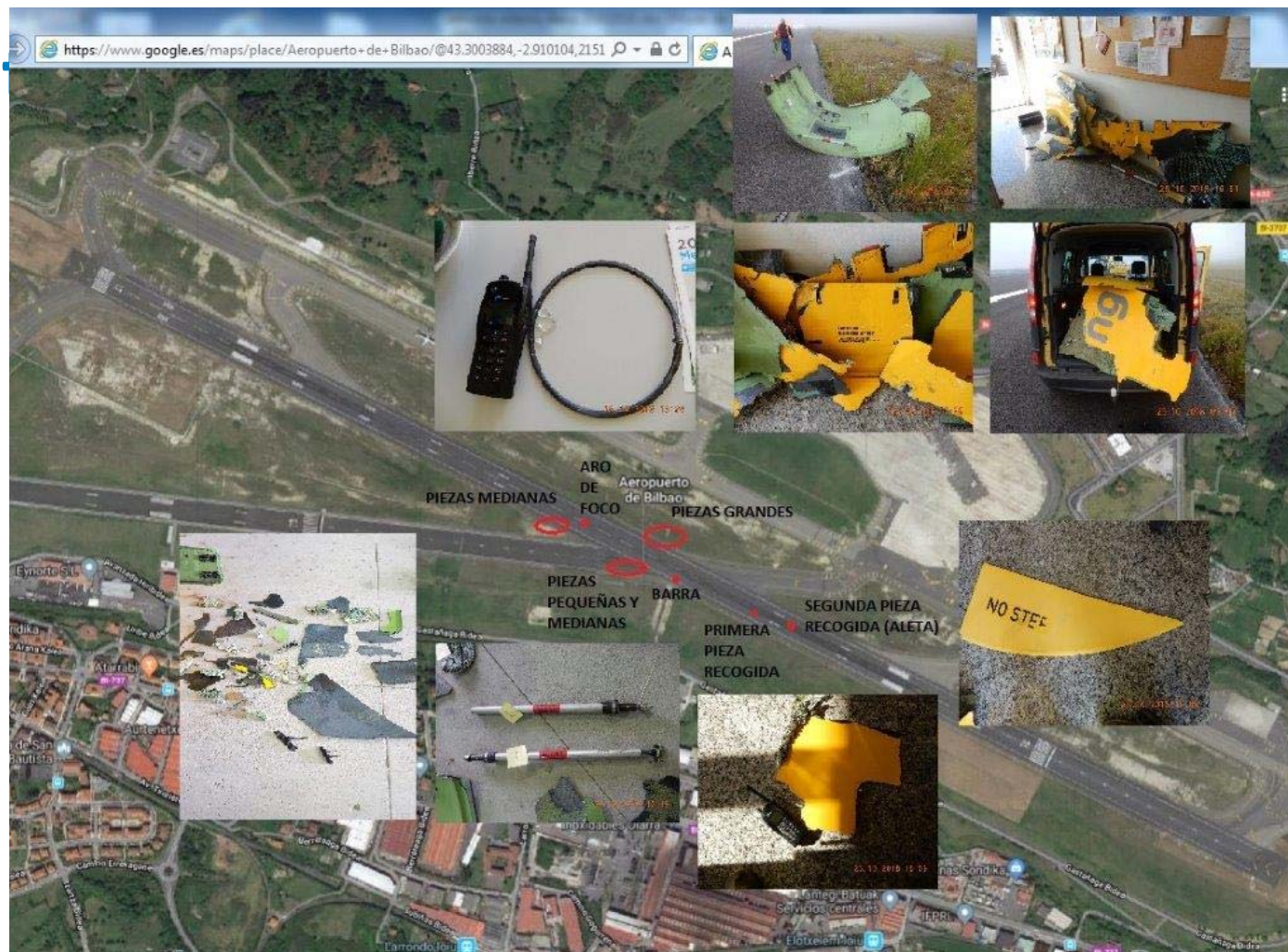
Safety Culture
(WHAT it is & What
do I do?, Training)

FOD can be composed of any material. It is important to use the correct description so that source areas can be identified and mitigation measures taken. FOD may include the following:

- a) aircraft and engine fasteners (nuts, bolts, washers, safety wire, etc.);
- b) aircraft parts (fuel caps, landing gear fragments, oil sticks, metal sheets, trapdoors, and tyre fragments);
- c) mechanics' tools;
- d) catering supplies;
- e) personal items (personnel badges, pens, pencils, luggage tags, drink cans, etc.);
- f) apron items (paper and plastic debris from catering and freight pallets, luggage parts, and debris from ramp equipment);
- g) runway and taxiway materials (concrete and asphalt chunks, rubber joint materials, and paint chips);
- h) construction debris (pieces of wood, stones, fasteners and miscellaneous metal objects);
- i) plastic and/or polyethylene materials;
- j) natural materials (plant fragments, inanimate wildlife and volcanic ash); and
- k) contaminants from winter conditions (snow, ice).

FOD prevent

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Incidente
FOD VLG
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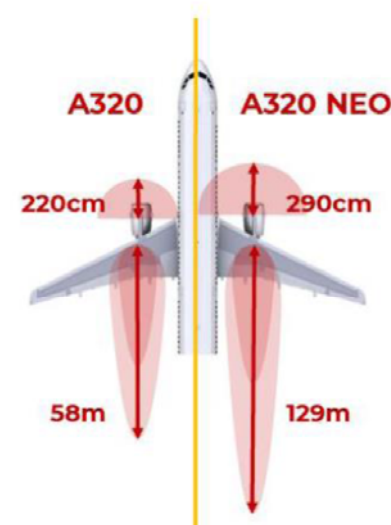


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Se ha detectado que las aeronaves con motores **CFM International LEAP-1A** necesitan unas áreas de seguridad de los motores significativamente superiores a las necesarias con otro tipo de motor y a las consideradas en la Normativa de Seguridad en Plataforma (NSP).

Así, la comparativa de las distancias de seguridad respecto a la motorización con CFM56 en régimen IDLE THRUST y a la NSP es la siguiente:

Motorización	CFM56	LEAP-1A	NSP
Distancia de seguridad posterior al motor	58 m	129 m	50 m



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APPENDIX A

FOD TRAINING

The following subjects should be included in the FOD training programme:

- a) Safety of personnel and passengers as related to FOD;
- b) Overview of the FOD control programme in place at the aerodrome;
- c) Causes and principal contributing factors of FOD;
- d) The consequences of ignoring FOD, and/or, the incentives of preventing FOD;
- e) Practicing clean-as-you-go work habits, and the general cleanliness and inspection standards of work areas;
- f) FOD Detection procedures, including the proper use of detection technologies (if applicable);
- g) Requirements and procedures for regular inspection and cleaning of movement areas;
- h) FOD Removal procedures;
- i) Proper care, use, and stowage of material and component or equipment items used around aeroplane while in maintenance or on aerodrome surfaces;
- j) Control of debris in the performance of work assignments (e.g. loose items associated with luggage, ramp equipment and construction materials);
- k) Control over personal items and equipment;
- l) Proper control/accountability and care of tools and hardware;
- m) How to report FOD incidents or potential incidents; and
- n) Continual vigilance for potential sources of hazardous FOD.



— END —

FOD prevention programme

Detection (WHERE they are or can come from?, Inspection)

FOD DETECTION



1. FOD Detection Operations

Operational areas are inspected as described in Part 2 Chapter 3, with additional inspections being made in construction areas and immediately after any aircraft or ground vehicle accident or incident or any spill of material to ensure all FOD has been detected and removed.

In addition to the above it is good practice for personnel on the movement area to employ a clean-as-you-go technique of looking for FOD in the course of their regular duties. When inspections occur at night, after the runway is closed or before the runway is opened, additional lights/lighting systems on vehicles are beneficial to better detect FOD.

It is normal for vehicles to be driven on clean, paved surfaces when possible. If a vehicle must be driven on unpaved surfaces, the driver has a responsibility to ensure the vehicle's tyres do not transport FOD (e.g. mud or loose stones) back on to the pavement.

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Detection (WHERE they are or can come from?, Inspection)

FOD DETECTION

2. Methods and Techniques of FOD detection



Detection Technologies

Recent technological developments have expanded the capabilities of FOD detection through automation. Advanced technologies are now available for automated FOD detection, including capabilities for continuous monitoring on runways and other aircraft movement areas to supplement the capabilities of aerodrome personnel.

If an aerodrome chooses to implement these new FOD detection technologies, procedures should be established with the Air Traffic Control (ATC) services to ensure that appropriate and timely action is taken if FOD is detected.

The aerodrome operator should have considerable flexibility in terms of how to implement continuous detection systems at the aerodrome. The user interface may be located in the aerodrome's operation or maintenance centre, and/or it may be located in the ATC tower.

FOD prevention programme

Detection (WHERE they are or can come from?, Inspection)



Regardless of the configuration, an aerodrome operator will determine the most efficient way to notify aerodrome personnel to remove the detected FOD, as well as the ATC staff to take appropriate action if a significant risk is presented.

When using continuously operating FOD detection technologies on a runway a decision on the appropriate action to be taken has to be made once an object is detected. If the location or characteristics of the FOD present no immediate safety hazard the object should be removed as soon as the operational schedule permits. If the location or characteristics of the FOD present an immediate safety hazard, provisions in the FOD management program should clearly indicate that a hazard exists and allow for an action to be taken that may lead to the temporary cessation of the runway operations.

Although not all types of FOD will necessitate an immediate runway closure, a prompt decision is needed in all cases, to assess the hazard posed by FOD. Aerodromes should establish procedures for handling such matters in cooperation with their ATC services.

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Detection (WHERE they are or can come from?, Inspection)

FOD Detection Technologies Performance Evaluation - Locations

- Stationary Radar @ PVD
- Stationary Hybrid @ BOS
- Stationary Electro-Optical @ ORD
- Mobile Radar @ ORD, HNL



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Detection (WHERE they are or can come from?, Inspection)

- (1) How the FOD object was detected
- (2) Date and time of FOD detection and retrieval
- (3) Description of FOD retrieved (category, size, color), and/or image (if available)
- (4) Location of FOD object (coordinates and reference to the AOA location)
- (5) Possible source
- (6) Name of personnel detecting / investigating FOD item
- (7) Airport operations and weather data during the FOD detection event



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Safety Actions (HOW and WHO is going to fix it, Action Plan)

1. FOD removal equipment



- **Mechanical systems**

Types of mechanical removal systems may include:

- a) Power Sweepers. The sweeper removes debris from cracks and pavement joints, and is typically used in all of the movement area.

Note: For all brush systems, operators are cautioned that bristles can detach from brooms and produce a FOD source. Brushes made with metal bristles or spines are not recommended to be used for FOD removal purposes. Plastic or combination plastic/metal bristles may be appropriate, but the user should consult the equipment manufacturer for specific recommendations.

- b) Vacuum Systems. These systems perform FOD removal functions similar to the power sweepers described above. The systems may also perform in conjunction with mechanical brooms or other recirculation air units.
- c) Jet Air Blowers. These systems move FOD and other debris by directing a stream of high velocity air towards the pavement surface. When used in the aerodrome environment, it is recommended that these systems incorporate a debris collection mechanism so that FOD will not simply be relocated to another area.

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1. FOD removal equipment



- **Non mechanical systems**
 - a) **Friction Mat Sweepers.** A rectangular assembly towed behind a vehicle that employs a series of bristle brushes and friction to sweep FOD into sets of capture scoops, which are covered by a retaining mesh to hold collected debris.
 - b) **Magnetic Bars (attached to vehicles).** These bars can be suspended beneath tugs and trucks to pick up metallic material. However, the bars should be cleaned regularly to prevent them from dropping the collected debris. Magnetic bars are not able to pick up the following types of common FOD materials: titanium, aluminium alloys and some stainless steels.
 - c) **Rumble strips (also known as “FOD Shakers”).** **While these devices may have been used in the past, they are no longer a widely accepted FOD removal system.** Their effectiveness at removing debris from tires or vehicle undercarriages is negligible, and the equipment can generate its own FOD if not cleaned out regularly.

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Continuous Awareness (WHEN You see it, Campaigns)



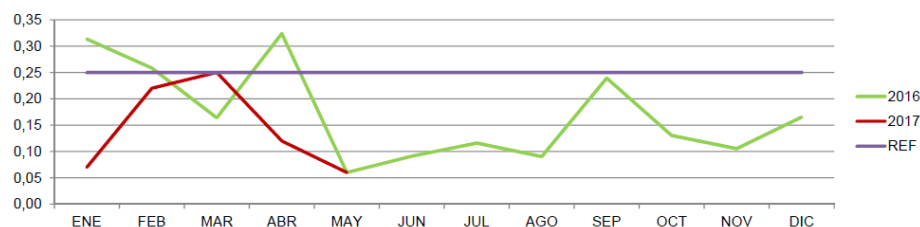
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Follow Up (WHEN and HOW MUCH?, Safety Indicators)

Comité Local de Seguridad en Pista

4. Indicadores de Seguridad Operacional en pista

INDICADOR DE FOD EN PISTA.



Respecto a los FODs en pista durante los cinco primeros meses del año 2017, solo se ha producido incumplimiento en el mes de MARZO, llegándose exclusivamente al nivel de referencia.

Analizando la tendencia de 2017 no es posible determinar un patrón o justificación relativa a ningún tipo concreto de FOD en una misma pista, por lo que se consideran hechos puntuales y con un origen diverso. Estos incidentes son tratados individualmente en caso de ser graves a través del MAD-PGS-04.

Durante el 2015 y el 2016 se implantaron las medidas en prevención de FOD contempladas en el Programa de Prevención de FOD probándose eficaces durante los primeros 3 meses de 2017.

Dicho programa debe ser revisado en 2017 para fijar nuevas medidas y/o objetivos.



RFJ1

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TORREJON DE ARDOZ
MADRID

17 OCT 2017

F-18

1 CASUALTY



Diapositiva 20

RFJ1

Reyes Fiz Jorge; 12/07/2019

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END

Thanks for your attention!!

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