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***BASIC AIRPORT SAFETY & OPERATIONS SCHOOL***  
***FAA/AAAE***

***Challenges to Airport Ramp &  
Runway Debris Control***

***Airport Technology***  
***Boeing Commercial Airplanes***

# ***Airport Ramp & Runway Debris Control***

- **What is “Airport FOD”**
- **The Airport Role**
- **The Airline Role**
- **How is Airside FOD Generated**
- **How to Control the FOD Problem**
- **Conclusions**



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## *What is “Airport FOD”*

**It Can Be a Bolt, a Concrete Chip, a Piece of Paper, a Paint Can, a Hat, a Passenger, Tire Tread....**

## A photograph of various items found in a suitcase, including plastic, safety wire, nails, catering supplies, stones, and baggage pieces. The items are scattered on a white surface. Labels with arrows point to specific items: 'Plastic' points to a clear plastic bag; 'Safety Wire' points to a long, thin metal wire; 'Nails' points to a small metal nail; 'Catering Supplies' points to a blue plastic container; 'Stones' points to a small, dark, irregularly shaped object; and 'Baggage Pieces' points to a small, dark, irregularly shaped object.



# Impacts of Airport FOD:

- ➔ Engine Ingestion on the Aircraft
- ➔ Aircraft damage
- ➔ Velocity Impact of Debris Launched by Jet Blast Into Other Aircraft, Personnel (Ramp/Passengers), and Buildings

**BOTTOM LINE: FOD = \$\$\$\$\$\$\$\$**









## *The Airport Role*

**The Responsibility for Cleanliness by Airports Serving Scheduled Airlines is as Follows:**

- **International Civil Aviation Organization - Annex 14**
  - **Recommendation**
- **Federal Aviation Administration - Part 139**
  - **Requirement**





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## *The Airline Role*

- ➔ **Airlines Generate Much of the FOD Found on the Airside Through Their Operations and Those of their Support Functions**
- ➔ **User Agreements Typically Identify the Agency Responsible for Cleaning Various Areas**



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## *How is it Generated*

- ➔ **Infrastructure**
  - **Physical Degradation of the Airport Surfaces and Facilities**
  - **Airside Maintenance/Construction Activities**
  
- ➔ **Operational Activities**
  - **Servicing & Maintenance of Aircraft**
  - **Windborne Debris from Adjacent Areas**
  - **Operation of Aircraft (Jet Blast)**
  
- ➔ **Personnel**
  
- ➔ **Weather Phenomena**

## *Infrastructure FOD Sources*

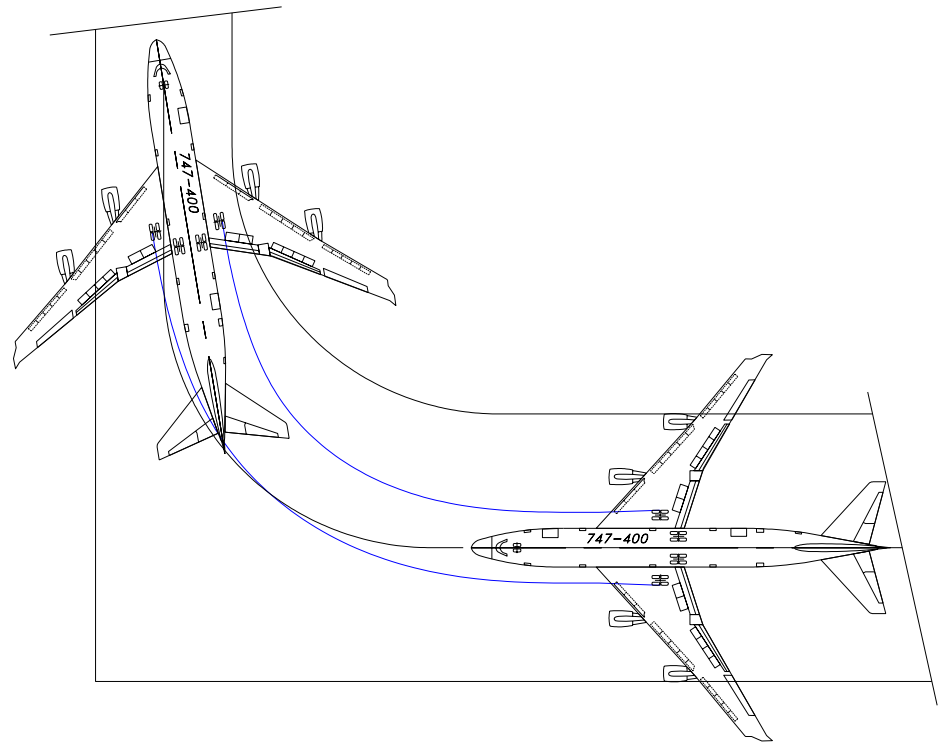
- ➔ **Broken Pieces of Pavement Collect at Edge of Gate Area, Then Are Carried Out Via Vehicle Tires**
- ➔ **Loose Pieces of Construction Material Can be Blown From the Gate Area Onto the Maneuvering Areas**





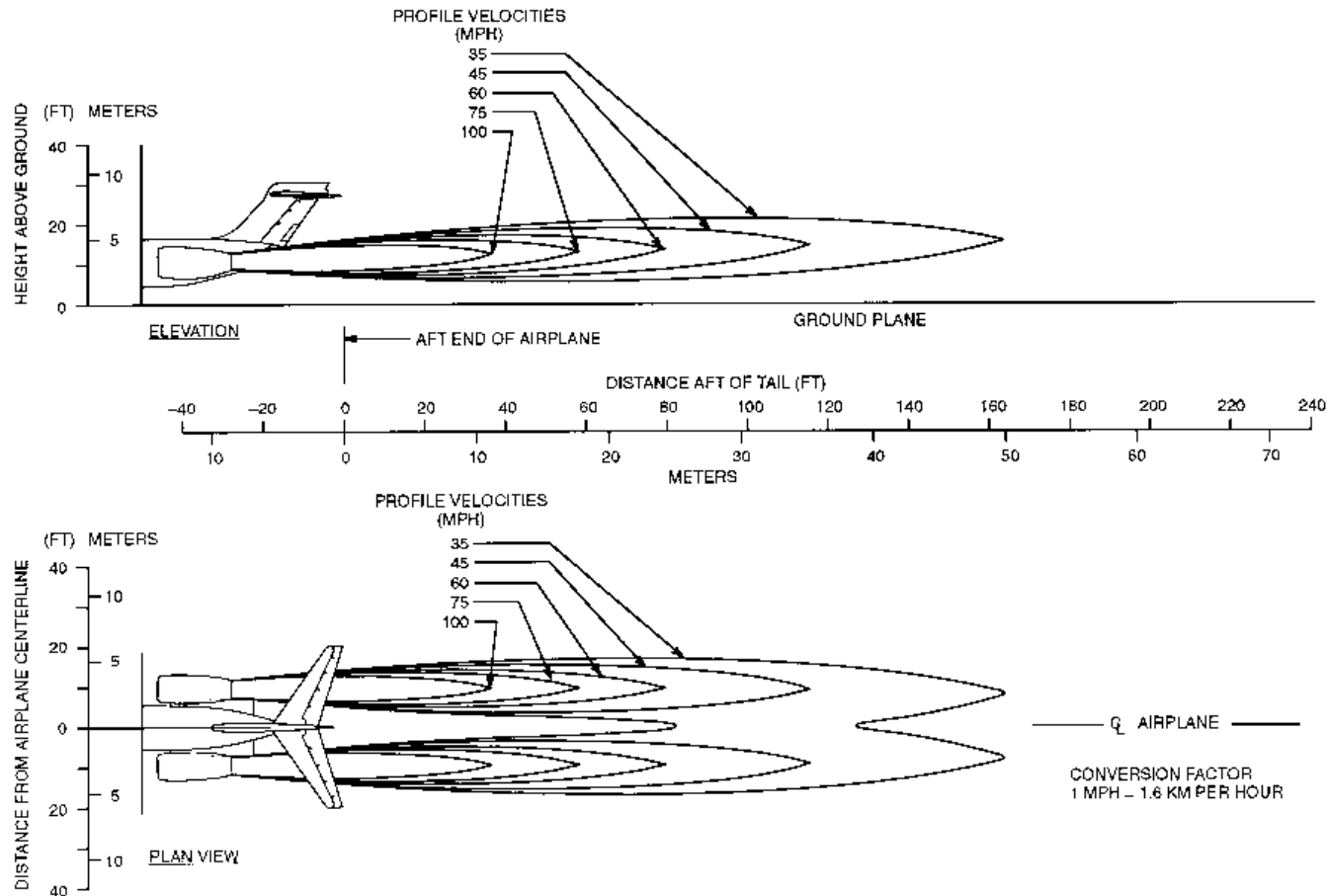
# *Operational FOD Sources*

- ➔ On a 150 FT (45m) Wide Runway, The #1 and #4 Engines Can Blow FOD from Shoulder Area Back Onto The Runway
- ➔ Jet Blast From Aircraft Turning At RW/TW Intersections Can Blow FOD Onto Runway



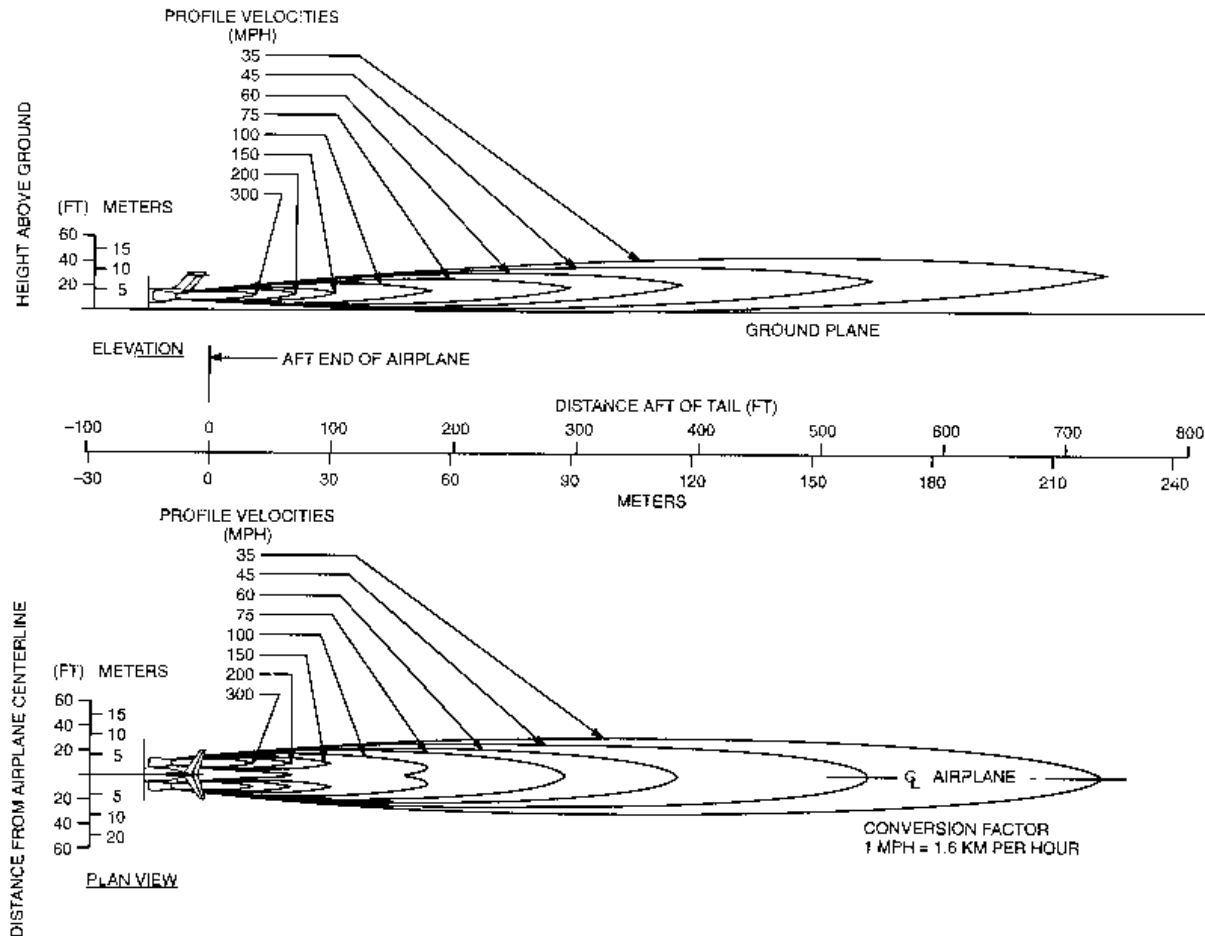


# *MD-90 Jet Blast - Breakaway Thrust*





# MD-90 Jet Blast - Takeoff Thrust





***This is not an optional cargo storage area!***







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# *How to Control The Problem*

- ➔ **Training**
- ➔ **Inspection by Airline and Airport Personnel**
- ➔ **Maintenance Activities**
- ➔ **Communication/Coordination**



# *Training*

- ➔ **Both Airline and Airport Personnel Need Training to:**
  - **Identify FOD**
  - **Know the Potential Results of Ignoring FOD**
  - **Know How to Eliminate FOD**
  - **Recurrent Training**
  
- ➔ **Key to This Effort Is the *ACTIVE* Participation of All Personnel, Especially Airline Station Management and Flight Crews**

## *Inspection*

- ➔ **Airline Personnel Should Participate, When Able, With the Airport Staff During the Daily Airside Inspections (This Will Ensure That the Local Airline Staff Know What Is Happening on the Airfield)**
- ➔ **FOD Inspections Must Be Carried Out at Regular Intervals**
- ➔ **Airlines Should Designate Individuals to Ensure That the Gate Areas Are Acceptable Prior to the Aircraft Operating There**



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## ***Maintenance Activities***

- ➔ **Sweeping Operations Should Be Scheduled And Available On An “As Needed” Basis. Airlines Need To Provide Access To Gate Areas**
- ➔ **Capability Must Exist to Respond to Repair Problem Areas (Hole in Taxiway, Etc.) So As To Minimize the FOD Potential**
- ➔ **Funding Must Exist to Maintain Paved Surfaces In Good Condition**
- ➔ **Procedures Must Be In Place (Airport & Airline) For Weather/Disaster Recovery, To Include FOD Removal**

## ***FOD Reduction Methods***

- ➔ **Rumble (Shaker) Strips**  
Can be Used to  
Dislodge FOD From  
Vehicle Undercarriage  
Prior to Operating on  
the AOA
- ➔ **These are Locally  
Manufactured and Can  
be Transportable**



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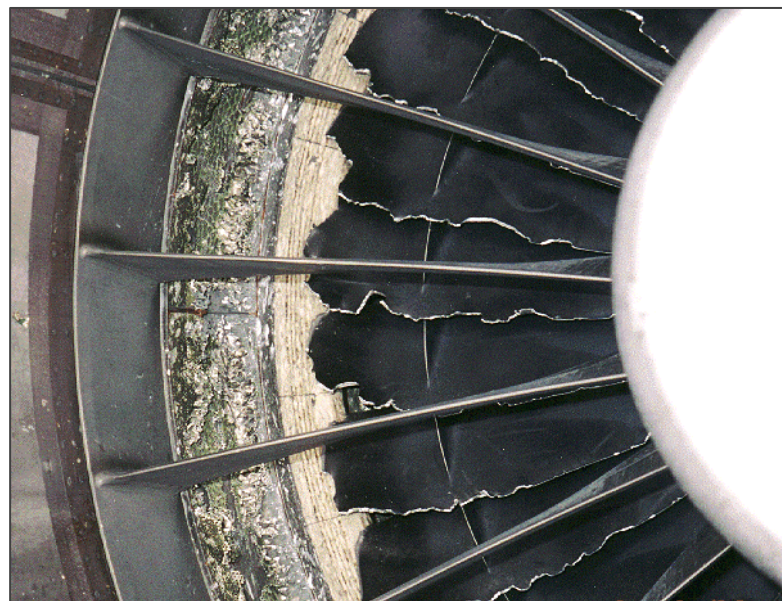
## ***Communication/Coordination***

- ➔ **Notification of Airside Construction Activities and Scheduled Maintenance Must Be Disseminated to the Airport Users**
- ➔ **Airport Pre-Construction Planning Must Include the Methodology to Control and Contain FOD Generated by the Construction Activity**
- ➔ **Airlines Need an Active Airport Users Committee to Coordinate Their FOD Control Efforts With the Airport and Other Tenants**





*Remember!!!!*





## ***Conclusions***

- ➔ **Control FOD Through a Combination of the Following:**
  - Training
  - Inspection
  - Maintenance
  - Communication/Coordination
- ➔ **Airlines Need an Active Airport Users Committee To Coordinate Their FOD Control Efforts With the Airport And Other Tenants**
- ➔ **FOD Is Everyone's Responsibility and by Teamwork It Can Be Controlled!**





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