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## *Cleared for Takeoff! Airport Inspection and Ramp Safety Practices*

May 10, 2012

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# Today's Agenda

- 1) Introductions
- 2) Presentations
- 3) Q & A
- 4) Close

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# Spring 2012 ACRP Webinar Series

- *May 10 - Cleared for Takeoff! Airport Inspection and Ramp Safety Practices*
- *June 5 - Aviation Fuel Costs and Alternatives*
- *TBD - A Whole New Climate: Helping Airports Implement Greenhouse Gas Reduction and Sustainable Construction Strategies*

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# Today's Speakers

Moderated by Freddie James, Airport Certification Safety Inspector, FAA

1) Overview of *Synthesis 26: Current Airport Inspection Practices Regarding FOD (Foreign Object Debris/Damage)*

- C. Daniel Prather of Prather Airport Solutions



2) Overview of *Synthesis 29: Ramp Safety Practices*

- Joanne Landry of Landry Consultants
- Shane Ingolia of Ricondo & Associates



3) Overview of *Research Results Digest 15: Use of Towbarless Tractors at Airports—Best Practices*

- Colleen Quinn of Ricondo & Associates



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# What is the Airport Cooperative Research Program (ACRP)?

- Industry-driven, applied research program that develops near-term, practical solutions to problems airport operators face.
- Managed by the Transportation Research Board (TRB) of the National Academies.
- Sponsored by the Federal Aviation Administration.
- Research is conducted by *you*—individuals and firms selected on the basis of competitive proposals.

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# Ways to Get Involved in ACRP

- Submit a research idea, also called a Problem Statement.
- Prepare a proposal to conduct research.
- Volunteer to participate on a project panel. We reimburse for travel.
- Apply to be an ACRP Ambassador or member of the ACRP Speakers Bureau.
- Use our research results.

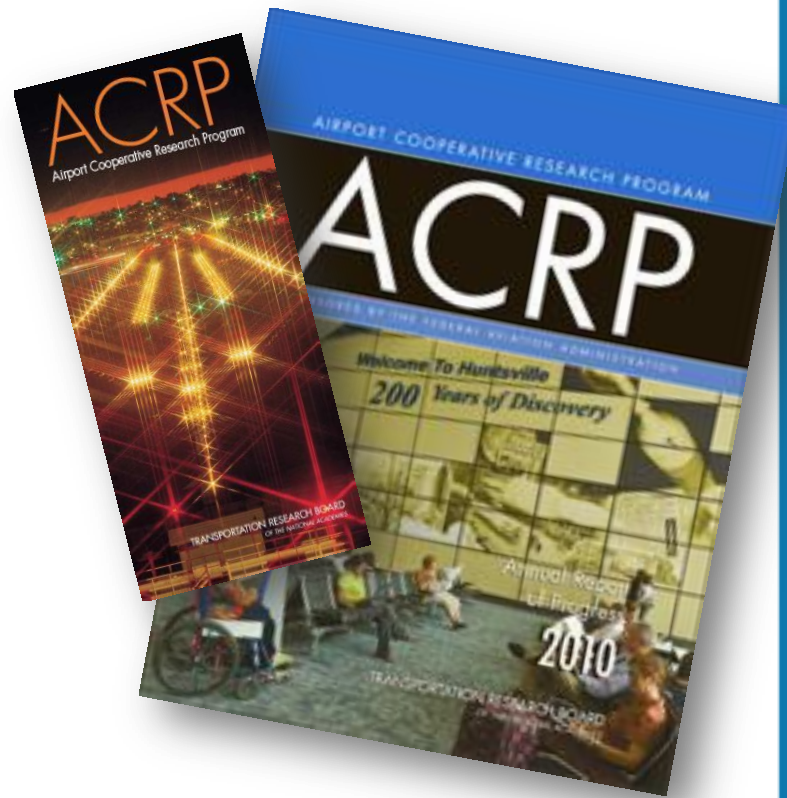
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# ACRP Synthesis 26: Current Airport Inspection Practices Regarding FOD (Foreign Object Debris/Damage)

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**C. Daniel Prather, Ph.D, A.A.E.  
Prather Airport Solutions, Inc.**

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# C. Daniel Prather, Ph.D., A.A.E. Principal Investigator

- Principal of Prather Airport Solutions, Inc.
- Current Department Chair and Professor of Aviation Science at California Baptist University
- Former Associate Professor of Aerospace at Middle Tennessee State University
- Former Assistant Director of Operations at Tampa International Airport



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# ACRP Synthesis 26 Topic Panel

Michael J. Begier, U. S. Department of Agriculture

Kevin B. Bleach, Port Authority of New York and New Jersey

Christine Gerencher, Transportation Research Board

Edwin E. Herricks, University of Illinois – Urbana-Champaign

John Ostrom, Metropolitan Airports Commission – Minneapolis  
– St. Paul International Airport

Brett Patterson, Vancouver International Airport Authority

Stephen M. Quilty, SMQ Airport Services

Ryan E. Rocha, San Antonio Airport Systems

Tricia Halpin, FAA (Liaison)

Richard Marchi, ACI-NA (Liaison)

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# Presentation Agenda

- **What is FOD?**
- **What are the sources of FOD?**
- **What are the types of FOD?**
- **How serious is FOD?**
- **How was the study conducted?**
- **Results**
  - Inspection
  - Detection
  - Removal
  - Documentation
  - Training and Promotion
- **Concluding thoughts**

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# What is FOD?

“A substance, debris, or article alien to a vehicle or system which would potentially cause damage.” ~NAFPI

“Any object, live or not, located in an inappropriate location in the airport environment that has the capacity to injure airport or airline personnel and damage aircraft.” ~ FAA

“Any object that is left in an area where it could possibly cause damage.” ~AAGSC



# What are the Sources of FOD?

- Personnel
- Airport infrastructure
- Environment
- Equipment operating on the airfield



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# What are Types of FOD?

- Aircraft and engine fasteners
- Aircraft parts
- Mechanics tools
- Catering supplies
- Flight line items
- Apron items
- Runway and taxiway materials
- Construction debris
- Plastic and/or polyethylene materials
- Natural materials
- Contaminants from winter conditions



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# How Serious is FOD?

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- **FOD can cause**
  - Damage to aircraft.
  - Injury to personnel.
- **FOD can cost**
  - Directly, \$474 million annually (U.S.) & \$1.26 billion annually (Globally).
  - Indirectly, \$5.2 billion annually (U.S.) & \$13.9 billion annually (Globally).



# How was the Study Conducted?

- **Literature review**
- **Survey instrument – “Airport Survey of Inspection Practices”**
  - Sent to 56 airports (U.S., military and non-U.S.)
  - 50 airports responded
- **Survey instrument – “Survey of Manufacturers/Suppliers of Airport Inspection Technology/Equipment”**
  - Sent to all manufacturers and/or suppliers of equipment and technology considered useful to airports in this area
  - 7 manufacturers/suppliers responded

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# Results

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# Inspection Continuum

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Manual  
Vehicle with manual  
checklist



Vehicle with  
electronic checklist



Technology-assisted  
Manual  
Vehicle with GPS/GIS-  
based inspection and  
database application



# Inspection Practices

- Most airports rely on human/visual inspection for FOD.
- Most airports inspect movement areas (runways and taxiways) more frequently than non-movement areas.

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# Detection Continuum



Manual:  
Vehicle with human  
operator



Supplemental:  
Human-operated  
camera  
(on vehicle or building),  
mobile sensors



Automated:  
Radar  
Electro-optical  
Hybrid





# Detection Practices

- Most airports rely on manual detection of FOD by human/visual means, without any type of FOD technology in use.
- Most airports have some type of FOD management program in place.
- Those few airports with some sort of FOD detection technology in use believe that the benefits either exceed or are worthy of the cost.

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# Successful Airport Practices

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- **Inspection and Detection**

- FOD checklist
- FOD event/incident form
- Integration of FOD management with Wildlife Hazard Mgt Plan and SMS
- Regular, proactive FOD inspection focusing on movement and non-movement areas
- Reactive inspections as FOD is reported by pilots, ATC, etc.
- Supplemental manual inspections with automated detection technology



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# Removal Continuum



## Non-mechanized:

Tow-behind friction mats  
Magnetic bars  
Rumble strips



## Mechanized:

Power sweepers  
Vacuum systems  
Jet air blowers



## Removal Practices

- Most airports use both human/visual means and either mechanized or non-mechanized means to remove FOD.
- Of the mechanized means in use, most airports use power sweepers and vacuum systems. Of the non-mechanized means in use, most airports use magnetic bars.
- Of those airports using mechanical means to remove FOD, most believe these means are very useful.
- The most common type of FOD removed on paved movement areas is runway and taxiway materials, including concrete chunks, rubber joint materials, and paint chips.
- The most common type of FOD removed on ramp areas is apron items, including paper and plastic debris, luggage parts, and debris from ramp equipment.

# Successful Airport Practices

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- **Removal**

- FOD containers placed throughout ramp/gate areas
- Closure of pavement as necessary to prevent aircraft operations on a contaminated surface
- Proactive removal of FOD with the use of non-mechanized equipment such as tow-behind friction mats and magnetic bars or mechanized equipment such as power sweepers and vacuum system



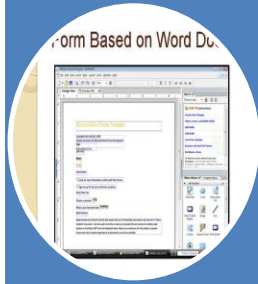
# Documentation Continuum

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## AIRPORT COOPERATIVE RESEARCH PROGRAM



Fully manual:  
Hard copy  
form filed in  
folder



Computer  
form  
electronically  
filed



In-house,  
electronic  
database



Stand-alone  
FOD specific  
software  
program



Fully  
computerized:  
Database as  
part of FOD  
detection  
system





# Documentation Practices

- Most airports document FOD most of the time FOD is removed.
- When documenting FOD, most airports record the location of FOD, the date and time FOD were detected and/or retrieved, a description of the FOD, and the name of personnel investigating and removing FOD.
- Most airports do not currently utilize an electronic database for documenting FOD.
- Of those airports that do utilize an electronic database, the most common criterion for analysis is location of FOD.

# Successful Airport Practices

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- **Documentation and Analysis of Data**
  - Electronic database with records of FOD removed from movement areas
  - Photographs of FOD removed from movement areas
  - Regular analysis of data to reveal trends in types of FOD, locations of FOD, and possible generators of FOD, as well as any reductions in FOD removed.



# Training and Promotion

- **Human Factors**
- **Culture**
- **Training**
- **Promotion**
  - Commitment
  - Visibility
  - Awareness



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# Training and Promotion Practices

- Most airports utilize FOD letters, notices, and/or bulletins to enhance awareness of their FOD management program.
- According to participating airports, only airport operations personnel, airport maintenance personnel, and airport management place a high level of importance on FOD management.
- At most airports, air carriers (if present) and FBOs play an active part in FOD management.
- At most airports, the FOD management program is handled by someone as part of their existing job duties.
- Most airports do not have a formal FOD training program.

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# Training and Promotion Practices cont.

- Most airports ensure the quality of their FOD management program by the use of management oversight.
- If additional resources were made available for FOD management, most airports would acquire equipment/technology for the detection and/or removal of FOD.
- When asked to share thoughts on how FOD management could be improved at their airport, most airports would like to see a better structured FOD management program, as well as the acquisition of technology to aid in FOD detection.

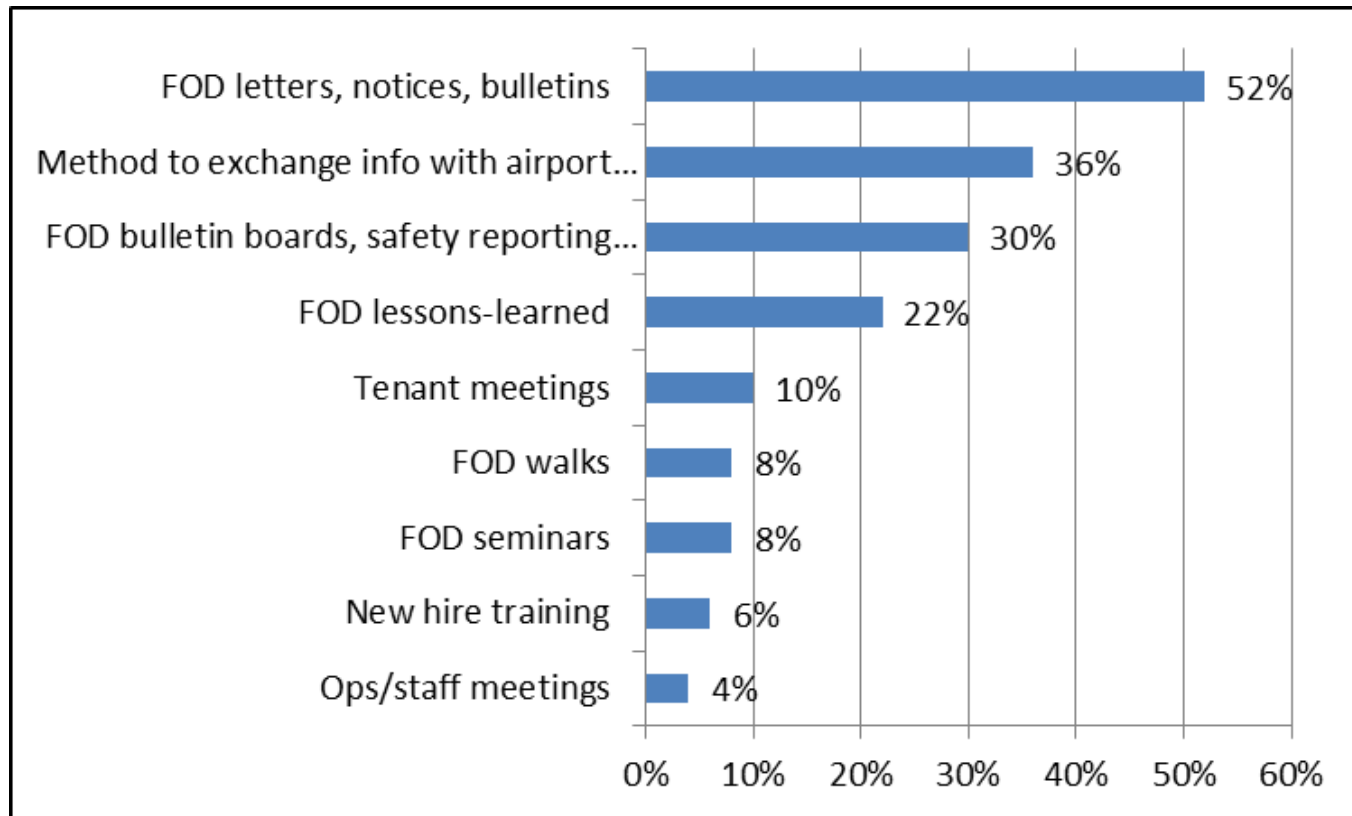
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# Awareness Programs and Practices

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# Successful Airport Practices

- **Training and Promotion**

- Commitment from management to the FOD management program and the goal of continuous improvement
- Tenant involvement and participation
- FOD committee, with regular meetings, to establish policy, guidelines, and goals.
- Regular FOD walks, with refreshments, photos, and awards
- Promotional and awareness program involving posters, t-shirts, bulletins, banners, and activities
- Training of personnel in good housekeeping practices and FOD prevention



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# Concluding Thoughts

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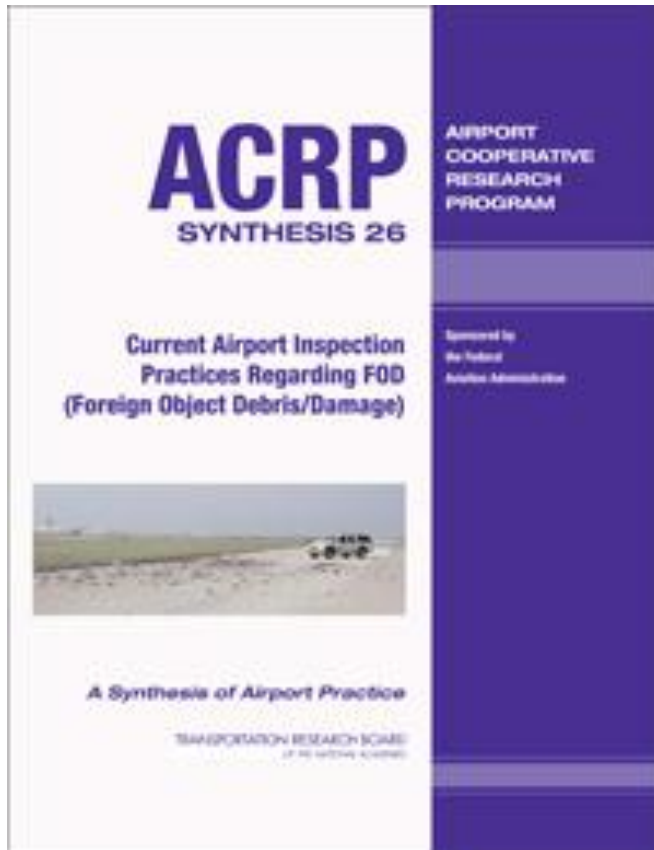
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- **FOD is a significant concern for the aviation industry.**
- **Airports can play a key role in reducing the effects of FOD by**
  - Developing a comprehensive FOD management program
  - Conducting regular FOD inspections
  - Acquiring equipment/technology to enhance the FOD inspection/detection/removal/documentation process
  - Promoting FOD awareness/prevention airport-wide
  - Studying successful practices on this issue at peer airports

# For additional information:

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## ACRP Synthesis 26: *Current Airport Inspection Practices Regarding FOD*

C. Daniel Prather

[pratherairport@yahoo.com](mailto:pratherairport@yahoo.com)

# ACRP Synthesis 29: Ramp Safety Practices



**Joanne M. Landry, MBA**  
**Landry Consultants LLC**

**Shane Ingolia**  
**Ricondo & Associates Inc.**

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**LANDRY**

# Joanne M. Landry Principal Investigator

- Principal, Landry Consultants LLC
- Director, sms4airports
- Safety Management System (SMS) Consultant
- MBA, University of Washington
- 25 years Program Management
- System Safety (ISO 14001)  
Experience in Oil and Gas Industry



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# Shane Ingolia Investigator

- Consultant, Ricondo & Associates, Inc.
- University of Southern Illinois, MPA
  - Airport Planning
  - GIS
- SMS FAA Pilot Study Phase 1 and 2 - Southern Illinois Airport



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# Oversight Panel

- Ms. Gail R. Staba – Synthesis Program Consultant, TRB
- Mr. Randall Berg – Director of Airport Operations, Salt Lake City
- Mr. Thomas Duffy – President, Safegate Airport Systems, Inc.
- Ms. Lynda Foley – Mgr. Technical Training and Dev., Dallas Fort Worth
- Mr. Gregory B. Haug – Airport Manager, Bismarck Municipal
- Mr. Paul Khera – Airport Safety and Security Officer, Alaska DOT
- Mr. Robert Royal – Mgr. Safety & Reg. Compliance, Delta Global Services
- Mr. Shawn M. Schroeder – Asst. Director Aviation, Springfield-Branson
- Ms. Chunyan Yu – Associate Professor, Embry Riddle Aeronautical
- Mr. Bruce Landry – FAA Liaison
- Mr. Patrick Rogers – FAA Liaison
- Ms. Christine Gerencher – TRB Liaison



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# ACRP Synthesis 29: *Ramp Safety Practices*

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**Objective = identify and describe the current state of ground handling practices, focusing on safety measures and training used at U.S. airports.**

- Investigate literature on ramp safety operations and training.
- Review past ramp safety surveys (ACI)
- Conduct surveys/interviews of commercial airports, airlines, and Ground Service Providers (GSPs)
- Identify duties and responsibilities
- Provide overview of stakeholders' roles in safety
- Discuss current ramp safety baseline and future trends such as technology, SMS, ISAGO, and airports as GSPs

## Research Approach / Participants

- Small survey group of GSPs and Airlines
- Electronic surveys using web-based tool
- Three representatives interviewed
- Industry-wide literature search
- ACI ramp surveys reviewed
- Human factors research
- Training programs review

	Airports	Airlines	GSP s	Total
Sent	33	7	8	48
Responses	29	7	4	40
% Total	87%	100%	50%	83%



# Key Findings

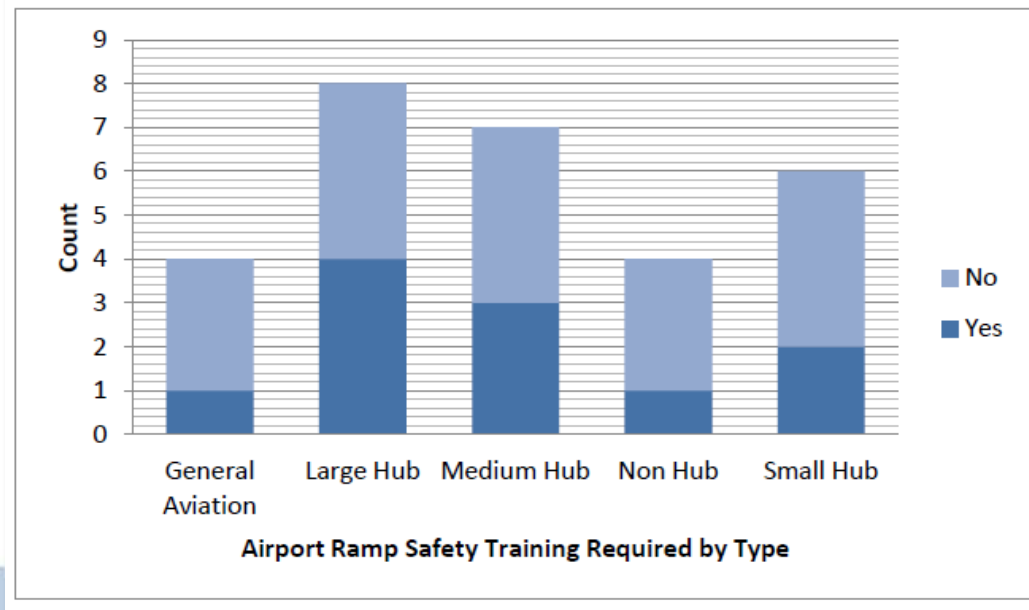
- Ramp areas are busy, congested, and complex
- No formal U.S. standards exist for markings or operations
- No standard or regulation exists for training and safety
- Training is primarily from Airlines and GSPs
- Airports train airside driver and some safety orientation
- FAA has Indirect oversight under Parts 119, 121, 135, 139
- Responsibility is managed by agreements, leases, licenses
- Lack of consolidated data



# Airport Responsibilities

- Airside driver training
- Some (limited) safety orientation
- Rules and Regulations and compliance
- Some ramp/safety committees
- Accident/incident investigation

FIGURE 5 AIRPORT RAMP SAFETY TRAINING REQUIRED



“Does your airport require airside safety training for tenants (not including AOA or AMA driving)?”

# Airline and GSP Responsibilities

- Extensive skills based training
- OJT supervision and team safety leaders
- Non-punitive reporting systems
- OSHA compliance
- Best practices
- Collaboration with GSPs/Airlines
- Markings and standards at gates

Repair/Replacement Part	Costs
Elevator assembly	\$264,708
Inboard flap assembly	\$224,872
Leading edge slat assembly	\$52,863
Wingtip assembly	\$28,872
Outboard flap assembly	\$255,845
Inlet cowl	\$329,203
Main entry door	\$171,220
Radome	\$19,712
Cargo door	\$58,327
Aileron and tab assembly	\$183,545

Source: Boeing Commercial Airplanes Group, CASA 2002



# Industry Trends

- Outsourcing core GSP services appears to increase risks
- Fewer airport operations staff (for oversight / compliance)
- Higher volumes of flights and larger aircraft
- Increased accidents and incidents
- Increased congestion
- Cost cutting in training, equipment maintenance, and staff supervision
- Lack of safety culture
- Safety data indicates upward trends
- Ground is more dangerous than air

FSF discovered that the largest proportion – 43% – of ramp accidents happen in the “gate stop” area. Next is the gate entry and exit area with 39%, and the remaining 18% happen between gate entry/exit and the runway. There are far more incidents involving damage to stationary aircraft than to moving ones, and even more incidents – in simple numbers rather than value – are “equipment-to-equipment” damage (Learmount 2005).

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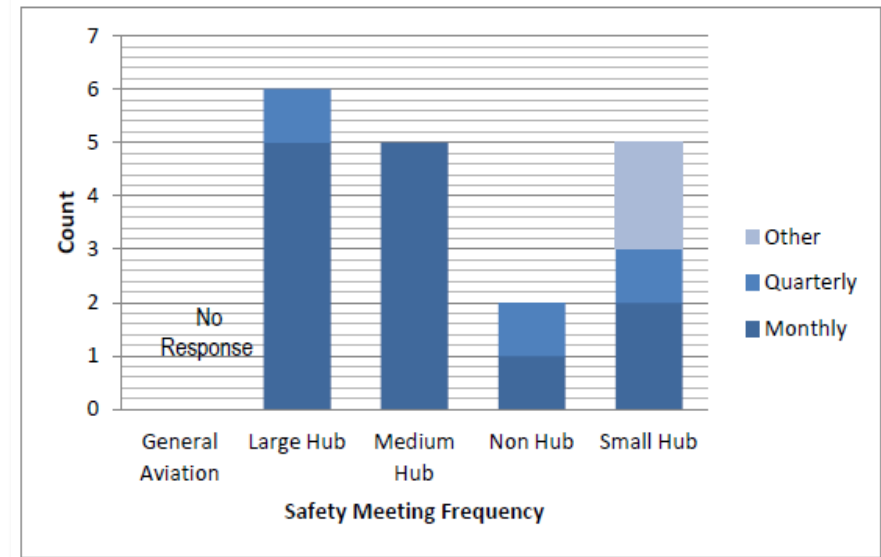
# Industry Suggestions

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1. **Safety Committees**
  - a) Safety culture changes
2. **Promotion and Training**
  - a) Standardized licensing, training, and certification
  - b) Reporting near misses
3. **Data Management and Reporting**
  - a) FAA consolidated data
  - b) Airport/Airline/GSP Collaboration
4. **Operational Improvements**
  - a) Ramp Towers
5. **Standards, Policies, Controls, Audits**
  - a) Minimum standards for ramp operations
  - b) Safety Management Systems
  - c) More in-depth ramp inspections

FIGURE 4 SAFETY MEETING FREQUENCY





# Possible FAA Initiatives

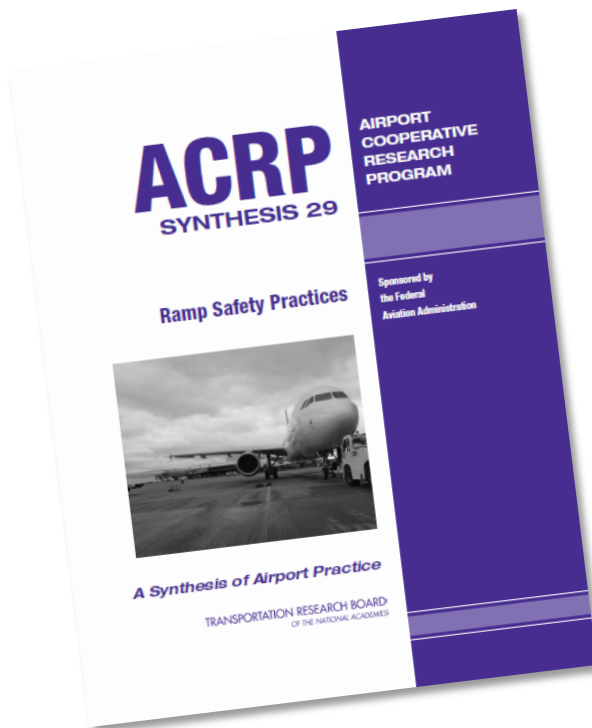
- October 7, 2010 – NPRM to include SMS on non-movement areas
- February 1, 2011 – NPRM entitled Safety Enhancements Part 139, Certification of Airports that requires safety training for airside access

***NPRM Safety Enhancements Part 139, Certification of Airports***  
Non-Movement Area Safety Training – “The FAA has concluded non-movement area safety can be improved with increased training. Airport workers must be knowledgeable and aware of the various activities that take place in the non-movement area.”

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# For Additional Information:



## ACRP Synthesis 29: *Ramp Safety Practices*

[http://onlinepubs.trb.org/onlinepubs/acrp/acrp\\_syn\\_029.pdf](http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_029.pdf)

- Joanne M. Landry
  - [joanne@landryconsultants.com](mailto:joanne@landryconsultants.com)
  - [www.sms4airports.com](http://www.sms4airports.com)
- Shane Ingolia
  - [s\\_ingolia@ricondo.com](mailto:s_ingolia@ricondo.com)

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**LANDRY**

**ACRP 04-07A**  
**Research Results Digest 15:**  
**Use of Towbarless Tractors at Airports**  
**- Best Practices**

**Colleen E. Quinn, P.E.**  
**Ricondo & Associates, Inc.**

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# Colleen E. Quinn, P.E. Principal Investigator

- Vice President, Ricondo & Associates, Inc.
- Professional Engineer (P.E.) States of Illinois, Florida, and Pennsylvania



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# ACRP 04-07A Oversight Panel

- Allen D. Parra, DFW Airport (Chair)
- Vincent J. Cardillo, Massport
- Richard P. Dei Tos, Metropolitan Washington Airlines Committee
- Paul Herrera, Los Angeles World Airports
- Joanne Landry, Landry Consulting
- William Lonergan, City of Chicago Department of Aviation
- Richard A. McAdoo, Crown Consulting
- Gerald P. McGill, Continental Airlines
- Steve Sogg, Boeing Company
- Paul Friedman, FAA Liaison
- Freddie James, FAA Liaison
- John Lott, FAA Liaison
- David Lotterer, FAA Liaison
- Paul McGraw, Air Transport Association Liaison
- Mike R. Salamone, ACRP Senior Program Officer

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# ACRP 04-07A Origin

*ACRP 04-07, Comparison of Airport Apron Management and Control Programs with and without Regulatory Oversight*



*ACRP 04-07A, Best Practices for Managing the Use of Towbarless Tractors at Airports*

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## ACRP 04-07A Research Results

- Research Results Digest 15: *Use of Towbarless Tractors at Airports – Best Practices*
- Provides understanding of the operational and training issues associated with TBLT operations
- Provides industry-wide guidance for consideration by airports and operators considering the management or initiation of towbarless tractor operations
- Supports level of standardization in operations
- Does not replace existing FAA, airline, airport, or equipment manufacturer guidance
- Published March 2012



# Introduction

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- Background
  - Increased use of Towbarless Tractors (TBLT) also TLTV
  - Lack of industry-wide guidance on the use of TBLTs
  - Growth in TBLT use expected
- Uses of TBLTs
  - Dispatch towing (towing fully loaded revenue airplane to location near departure runway end)
  - Pushback towing (towing revenue airplane from parked position to taxiway)
  - Maintenance Towing (towing airplane for maintenance or remote parking purposes, typically unloaded)
  - Empty (operating without an airplane in tow)

# Introduction (cont'd)

- Advantages of TBLT Operations
  - Higher operating speeds than conventional towbar tractors
  - Increased maneuverability
  - Energy and environmental conservation
  - Standardization of equipment (eliminates need for aircraft-specific towbars)
  - More secure control of aircraft and greater responsiveness



# Purpose of TBLT Best Practices

- Developed as a reference that is useful to airports and aircraft operators
- Provides practical guidance to assist airports and aircraft operators develop training programs for the safe use of TBLTs
- Provides practical guidance to assist airports and aircraft operators in developing and implementing standard set of guidelines for safe operations of TBLTs
- Increases awareness of safety considerations associated with TBLT operations



# Research Process

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Collect and  
Analyze Data and  
Information

Define Applicable  
Regulatory  
Guidance

Define Best  
Practices

- Information Sources
  - Airlines using TBLTs
  - Airports at which TBLTs are in use
  - Aircraft manufacturers
  - Aviation industry organizations
  - Airport safety working groups involved with TBLT operations

# Use of Towbarless Tractors at Airports - Best Practices Overview

- Requirements
  - TBLT Operator Requirements
  - TBLT Vehicle Requirements
  - Aircraft-Under-Tow Requirements
- TBLT Practices
- Communication
- Responsibilities
- Weather Considerations
- Emergency/Abnormal Procedures

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# Definition of Terms

- ATC
- ATCT
- Airport Markings
- AOA
- Apron
- ASDE
- ATIS
- Dispatch Towing
- Empty
- Escort
- Flight Deck Observer
- FOD
- “Hold Short”
- Light Gun
- LOS
- Lost Communications
- Maintenance Towing
- Monitor
- Movement Area
- Night
- Non-movement Area
- NOTAMs
- Oversteer
- Pushback Towing
- Runway Incursion
- Ramp Control
- Read Back
- Route
- RVR
- Situational Awareness
- Super Tug
- Tail Walker
- Taxi
- TLTV
- TBLT
- Visibility
- Wing Walker

**Update to critical definitions.**

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## TBLT Operator Requirements

- TBLT Operator: that individual(s) operating a TBLT to move an aircraft, whether employed by an airline, airport, or service provider
- Credentials
  - Background checks and screening
  - Valid state-issued driver's license
  - Valid airport security badge/identification
  - Airport driving privileges
- Training
  - Airport driver and airport movement area training
  - TBLT manufacturer training specific to equipment
  - Knowledge of airport rules and regulations



# TBLT Vehicle Requirements

- Minimize potential for tractor condition or equipment to contribute to an incident or affect safety of personnel or aircraft
- Movement Area Access – Airport and ATC procedures
- Mechanical – vehicle and accessories inspection
- Communication – intercom and two-way radios



# TBLT Vehicle Requirements (cont'd)

- Lighting – mounted and turned on when in operation
- Painting – international orange and reflective tape
- Markings – unique ID number clearly displayed; company/operator logo
- External Elements Protection – vehicle cab
  - Weather protection
  - Noise protection
- Equipment/Accessories – radios, seatbelts, placards, etc.

# Aircraft-Under-Tow Requirements

- Safety – identify, eliminate, control, document hazards (consistent with SMS approach)
- Mechanical
  - Braking system available at all times
  - Adherence to towing speeds (manufacturer, airline,, etc.)
- Lighting – on (unless otherwise specified)



# Aircraft-Under-Tow Requirements (cont'd)

- Communications
  - Flight deck observer (primary)
  - TBLT operator (secondary)
- Equipment/Accessories – airfield map, placards, backup communication
- Personnel
  - Flight deck observer for communications and emergency braking
  - Other

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# TBLT Practices

- Before Start – review procedures with flight deck observer
- Aircraft Pushback – wing/tail walkers, push straight back
- Aircraft Towing – ATC, hold short procedures, speeds, brakes
- Repositioning – “TBLT operating empty” use of service roads
- Dispatch Towing – towing revenue airplane

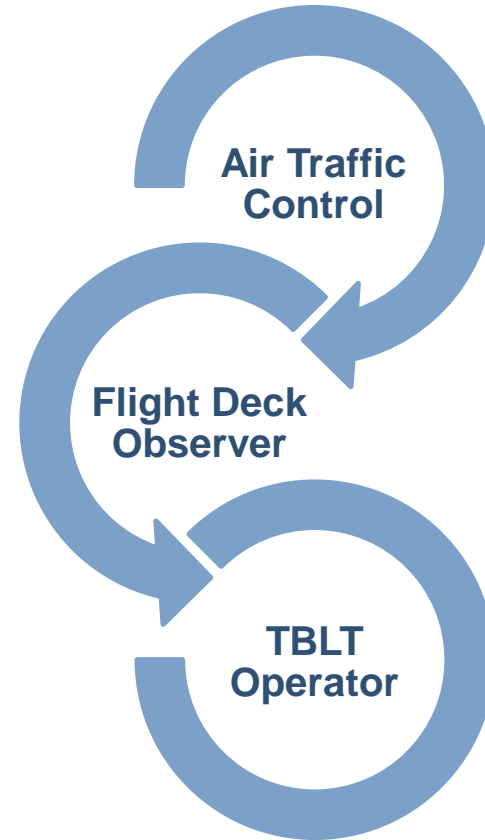
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# Communication

- Requirements – tow team must remain in *constant* contact with flight deck observer
- Flight deck observer: primary communicator / TBLT operator: secondary communicator
- Establish and follow appropriate procedures (aviation phraseology, read back procedures, etc.)
- Contingencies and emergency procedures





## TBLT Operator Responsibilities

- TBLT Owner – establishes guidance, procedures, training
- Flight Deck Observer – Pre-start briefings, checklists, communications
- TBLT Operator – Pre-start briefings, checklists, primary communication
- Escorts – poor weather, emergencies, review route, communication
- Wing/Tail Walkers – hand/wand signals, distance, line-of-sight
- Weather – escort, SMGCS plan, taxi speeds, lost communication procedures

# Weather

- Can affect the safety and efficiency of TBLT operations
- Consider use of escort
- Towing during low visibility is discouraged
- Familiarization with SMGCS Plan is critical
- TBLT tire chains may be considered in slush/icy conditions
- Reduce speeds during poor visibility
- Disconnect headset during lightening conditions
- TBLT operations restricted during high winds

# Emergency/Abnormal Procedures

- Lost Communications
- ATC Light Signals
- Disabled Aircraft
- Escorts
- Tow Disconnect
- Oversteering
- Aircraft Chocks
- Weather Conditions

**Graphic??**

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## Future TBLT Operations

- Technology
  - Semi-robotic tractor (pilot steers via towbarless system)
  - Reduction in emissions
- Future Standards?
  - Widening/strengthening service roads for TBLT
  - TBLT painting and lighting
  - Communication
  - Training
  - Reporting of TBLT incidents/accidents

# Critical TBLT Practices

- Communication.....communication.....communication
- More
- More

**Consider deleting  
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## Application of Research Results

- Advance awareness of operational, safety and training issues as TBLT operations are introduced (airlines, airport operations, air traffic control, service providers, etc.)
- Support development of standard procedures for TBLT operations in movement areas
- Develop effective TBLT operational and training program that reflects the unique combination of physical, operational, meteorological, and regulatory characteristics of each airport



# Reference Material

- IATA Airport Handling Manual
- FAA Cert Alert 08-06
- SAE Aerospace Recommended Practice: TBLT Vehicle Operating Procedure
- TLTV Industry Working Group
- FAR Part 91
- FAR Part 91.209 Aircraft Lights
- FAR Part 91K Fractional Ownership Operations
- FAR Part 121
- FAR Part 125
- FAR Part 129
- FAR Part 135
- FAR Part 139.303, Personnel
- FAA AC 00-65 Towbar and Towbarless Movement of Aircraft
- FAA AC 150/5210-5, Painting, Lighting, and Marking of Vehicles Used on an Airport
- FAA AC 150/5210-20, Ground Vehicle Operations on Airports

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# Additional information

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## AIRPORT COOPERATIVE RESEARCH PROGRAM

## ACRP Research Digest 15: *Use of Towbarless Tractors at Airports – Best Practices*

<http://www.trb.org/Publications/Blurbs/166829.aspx>

- Colleen E. Quinn, P.E.
  - [ce.quinn@ricondo.com](mailto:ce.quinn@ricondo.com)

### AIRPORT COOPERATIVE RESEARCH PROGRAM

Sponsored by the Federal Aviation Administration

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Responsible Senior Program Officer: Michael R. Salasano

## Research Results Digest 15

### USE OF TOWBARLESS TRACTORS AT AIRPORTS—BEST PRACTICES

This digest presents the results of ACRP Project 04-07A, "Best Practices for Managing the Use of Towbarless Tractors at Airports." The study was conducted by a research team under the leadership of Ricondo Et Associates, Inc., with Colleen Quinn acting as the Principal Investigator.

#### 1 INTRODUCTION

##### 1.1 Background

Towbarless tractors (TBLTs), also known as towbarless tow vehicles (TLTVs), are used to tow aircraft on the airport. TBLTs, as the name implies, do not use a towbar but instead use a pick-up device located in the center of the vehicle to cradle the nose gear tires in order to provide direct maneuvering of the aircraft. TBLT operations have increased in recent years due to the superior maneuverability provided by these vehicles and a renewed focus on energy and environmental conservation. The absence of towbars and the higher operating speeds mean that aircraft movements, pushbacks, gate-

to-gate towing, and maintenance towing can be carried out faster than with conventional towbar tractors, minimizing impacts to airport operations.

While some airports, airlines, and service providers have developed standards specific to their operation of TBLTs, no industry-wide guidance exists for this type of operation. Several incidents involving TBLTs have raised awareness of the need to establish "Best Practices" guidelines for TBLT operations.

##### 1.2 Development of Best Practices

The use of TBLTs varies from airport to airport but is generally increasing. Although a TBLT represents a large up-front capital cost, it has several benefits over traditional towbar tractors, including the following:

- More secure control of the aircraft and greater responsiveness;
- Simplicity of use and reduced operator training;
- Allowance for operation in the entire airport environ, including movement areas, without impacting airport operations;
- Elimination of the need to maintain multiple towbars (for each aircraft type); and
- Energy and environmental conservation.



Towbarless tractor after disengaging from an aircraft nosewheel.

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