

Workshop on Implementation of the New Global Reporting Format for Runway Surface Conditions

TALPA IMPLEMENTATION / EVOLUTION

Presented to: Global Reporting Format (GRF) Workshop
ICAO EUR Region - Frankfurt

By: U. S. Federal Aviation Administration

Date: December 10-11, 2019



**Federal Aviation
Administration**



TALPA Evolution

- **History**

- Airplane landing and excursion on contaminated surface
- NTSB set in motion various recommendations
- Originated as a Aviation Rulemaking Committee Initiative
- Implemented via voluntary efforts
- Created tools, guidance documents, and capabilities to assess surface conditions
- Tied assessed condition to airplane performance

TALPA Evolution

Stakeholder Participants

•Regulatory Authorities

- FAA (Airports, Flight Standards, Certification, NOTAMS, Rulemaking, Legal)
- Transport Canada
- Brazilian Certification Authority
- EASA (Limited Participation)



•Other Organizations

- Air Transport Association
- Airline Pilots Association
- Airports Council International
- Allied Pilots Association
- National Air Carrier Association
- National Business Aviation Association
- National Transportation Safety Board
- Neupert Aero Corporation
- Regional Airline Association
- Southwest Airlines Pilot Association
- Allied Pilots Association



•Airplane Operators

•Part 121

- ABX Air
- Alaska
- American Eagle
- American
- Continental
- Delta
- Express Jet
- Federal Express
- Northwest
- Pinnacle
- Southwest
- United
- UPS
- US Airways



•Airports

- Cherry Capital
- Chicago Airport System
- Chicago O'Hare
- Grand Rapids Regional
- Minneapolis/St. Paul Airport System



•Airplane Operators

•Part 91-K/125/135

- Alpha Flying, Inc
- Bombardier Flexjet
- Chantilly Air
- Flight Works
- Jet Solutions
- Conoco Phillips Alaska
- Net Jets
- Pogo Jet, Inc



•Airplane Manufacturers

- Airbus
- Boeing
- Bombardier
- Cessna
- Eclipse
- Embraer
- Gulfstream
- Hawker



TALPA Timeline

- **Recommendations for rulemaking activity – 2008 - 2009**
- **Two years of winter trial to test recommendations 2009 – 2011**
 - Industry meetings in summer of 2010 and 2011
- **Finalized Runway Condition Assessment Matrix - 2011**
- **Final decision was implementation would be done via voluntary means – Advisory Circulars, FAA orders, etc. - 2012**
 - Except for airports that take federal funding or have 121/135 flight operations
- **E-NOTAM system providing interface for airport creation of FICON information – 2015 – 2016**
- **Industry meeting – July, 2016**
- **Implementation – October 1, 2016**
- **Industry meeting – July, 2017**



TALPA Evolution

Airport Operator RCAM Version

| Assessment Criteria | | Downgrade Assessment Criteria | | |
|--|------|-------------------------------|---|-------------------------------|
| Runway Condition Description | Code | Mu (μ) ¹ | Vehicle Deceleration or Directional Control Observation | Pilot Reported Braking Action |
| • Dry | 6 | 40 or Higher | --- | --- |
| • Frost • Wet (Includes Damp and 1/8 inch depth or less of water) 1/8 inch (3mm) depth or less of: • Slush • Dry Snow • Wet Snow | 5 | | Braking deceleration is normal for the wheel braking effort applied AND directional control is normal. | Good |
| 5° F (-15°C) and Colder outside air temperature: • Compacted Snow | 4 | 39 to 30 | Braking deceleration OR directional control is between Good and Medium. | Good to Medium |
| • Slippery When Wet (wet runway) • Dry Snow or Wet Snow (Any depth) over Compacted Snow Greater than 1/8 inch (3mm) depth of: • Dry Snow • Wet Snow | 3 | | Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced. | Medium |
| Warmer than 5° F (-15°C) outside air temperature: • Compacted Snow Greater than 1/8 (3mm) inch depth of: • Water • Slush | 2 | 29 to 21 | Braking deceleration OR directional control is between Medium and Poor. | Medium to Poor |
| • Ice ² | 1 | | Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced. | Poor |
| • Wet Ice ² • Slush over Ice ² • Water over Compacted Snow ² • Dry Snow or Wet Snow over Ice ² | 0 | 20 or Lower | Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain. | Nil |

Aircraft Operator RCAM Version

| Assessment Criteria | | Control/Braking Assessment Criteria | |
|---|-------|---|-------------------------------|
| Runway Condition Description | RwyCC | Deceleration or Directional Control Observation | Pilot Reported Braking Action |
| • Dry | 6 | --- | --- |
| • Frost • Wet (Includes damp and 1/8 inch depth or less of water) 1/8 inch (3mm) depth or less of: • Slush • Dry Snow • Wet Snow | 5 | Braking deceleration is normal for the wheel braking effort applied AND directional control is normal. | Good |
| -15°C and Colder outside air temperature: • Compacted Snow | 4 | Braking deceleration OR directional control is between Good and Medium. | Good to Medium |
| • Slippery When Wet (wet runway) • Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 1/8 inch (3 mm) depth of: • Dry Snow • Wet Snow | 3 | Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced. | Medium |
| Warmer than -15°C outside air temperature: • Compacted Snow Greater than 1/8 inch(3 mm) depth of: • Water • Slush | 2 | Braking deceleration OR directional control is between Medium and Poor. | Medium to Poor |
| • Ice | 1 | Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced. | Poor |
| • Wet Ice • Slush over Ice • Water over Compacted Snow • Dry Snow or Wet Snow over Ice | 0 | Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain. | Nil |

TALPA – Aircraft Operator

US FAA Transport Standards

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Airplane Performance

- **FAA Goal – Data Basis**
 - Same basis for all manufacturers and operators
 - One set of assumptions when manufacturers create data
 - One set of guidelines for operators
 - ICAO adopted same time-of-arrival landing performance basis
 - Manufacturer supplied performance data is based on the same basic assumptions (one minor exception)
 - Operator guidance the same

Airplane Performance

- **Two important parts**
 - Manufacturer data to support implementation of TALPA
 - Takeoff – non-issue, AC's consistent to the greatest degree possible with EASA contaminated runway certification requirements (AC 25-31)
 - Landing – Time of Arrival performance data (AC 25-32)
 - Guidance for operators on implementation of performance data
 - Safety Alert For Operators
 - Operational guidance for TALPA operations - SAFO 19001
 - » Guidance also in FAA Order 8900
 - Recommendations for ops in heavy rain - SAFO 15009

Best Practices

Operational Data and Guidance

- FAA TALPA is **voluntary** for operators therefore the operational information provided are – ***“best practices for conducting a landing distance assessment at time of arrival”***
 - **Timeliness**
 - Typically top of descent
 - Determine how much field conditions can deteriorate and still land
 - **Safety Margin**
 - 15% recommended
 - **Autobrake Usage**
 - Guidance on when A/B data should be factored

Best Practices

Operational Data and Guidance

– Source of Data

- Manufacturer historical (adjusted if necessary) or based on AC 25-32
- If no data available – Generic factors maybe applied to unfactored AFM dry

– Additional Guidance

- Use of dispatch data
- Touchdown point

| Braking Action | Runway Condition Code | | | | | | |
|------------------------|-----------------------|---------------------|---------------|------------------|----------|------------------|--------|
| | 6 (Dry) | 5 Grooved /PFC Good | 5 Smooth Good | 4 Good to Medium | 3 Medium | 2 Medium to Poor | 1 Poor |
| Turbojet, No Reverse | 1.67 | 2.3 | 2.6 | 2.8 | 3.2 | 4.0 | 5.1 |
| Turbojet, With Reverse | 1.67 | 1.92 | 2.2 | 2.3 | 2.5 | 2.9 | 3.4 |
| Turboprop Note 1 | 1.67 | 1.92 | 2.0 | 2.2 | 2.4 | 2.7 | 2.9 |
| Reciprocating | 1.67 | 2.3 | 2.6 | 2.8 | 3.2 | 4.0 | 5.1 |

Operational Performance Implementation Issues

- **Manufacturer's TALPA data/guidance not available**
 - Default to factor's that are conservative because of simplification
- **Multiple contaminants reported**
 - Primarily takeoff issue
 - Data provided by manufacturer for single contaminant on the runway
 - Different airplanes have different critical contaminant for performance
 - Consensus, operators handle the choosing of the critical contaminant for performance purposes

Wet/Water Covered Runways

- **SAFO 19003, “Turbojet Braking Performance on Wet Runways”**
 - During moderate heavy rain wheel braking may degrade rapidly depending on the characteristics of the specific runway
 - Drainage capability
 - Friction surface
 - Rubber contamination

Wet/Water Covered Runways

“Knowing ahead of time whether your aircraft can or cannot stop within the Landing Distance Available if runway conditions deteriorate to a medium to poor condition (RwyCC = 2) is critical when operating in moderate or heavy rain. Go-around, holding, or diversion may be necessary if rainfall intensity increases beyond what might be acceptable for the intended operation.”

[SAFO 19003]

Challenges

- Manufacturer participation
 - Most manufacturers participating on a new airplane basis
 - One manufacturer provided new data set for all airplane types except the very oldest
 - One manufacturer provided guidance for all airplane types
- Training – NBAA created training module
 - Airline training left up to operators
- Operators understanding all of the options open to them
 - Autobrake usage
 - Dispatch Data
 - Reduced air distance
- Last minute change in reporting requirements on wet runway

Best Practices

- Development of a website for information and a bank of Frequently Asked Questions
 - All FAA lines of business participated
- Capability to accept/answer stakeholders on-going questions throughout implementation
 - Website
 - Industry meeting pre-implementation
 - Industry meeting following first year of implementation
 - Limited manufacturer participation

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Runway Condition Assessment Matrix

| Runway condition assessment matrix (RCAM) | | | | |
|---|---|---|---------------------------------------|--|
| Runway condition code | Assessment criteria | | Downgrade assessment criteria | |
| | Runway surface description | Aeroplane deceleration or directional control observation | Pilot report of runway braking action | |
| 6 | <ul style="list-style-type: none"> • DRY | --- | --- | |
| 5 | <ul style="list-style-type: none"> • FROST • WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) <p><i>Up to and including 3 mm depth:</i></p> <ul style="list-style-type: none"> • SLUSH • DRY SNOW • WET SNOW | Braking deceleration is normal for the wheel braking effort applied AND directional control is normal. | GOOD | |
| 4 | <p><i>-15°C and Lower outside air temperature:</i></p> <ul style="list-style-type: none"> • COMPACTED SNOW | Braking deceleration OR directional control is between Good and Medium. | GOOD TO MEDIUM | |
| 3 | <ul style="list-style-type: none"> • WET ("slippery wet" runway) • DRY SNOW or WET SNOW (any depth) ON TOP OF COMPACTED SNOW <p><i>More than 3 mm depth:</i></p> <ul style="list-style-type: none"> • DRY SNOW • WET SNOW <p><i>Higher than -15°C outside air temperature¹:</i></p> <ul style="list-style-type: none"> • COMPACTED SNOW | Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced. | MEDIUM | |
| 2 | <p><i>More than 3 mm depth of water or slush:</i></p> <ul style="list-style-type: none"> • STANDING WATER • SLUSH | Braking deceleration OR directional control is between Medium and Poor. | MEDIUM TO POOR | |
| 1 | <ul style="list-style-type: none"> • ICE ² | Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced. | POOR | |
| 0 | <ul style="list-style-type: none"> • WET ICE ² • WATER ON TOP OF COMPACTED SNOW ² • DRY SNOW or WET SNOW ON TOP OF ICE ² | Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain. | LESS THAN POOR | |

Implementation Tools

- **Advisory Circular 150/5200-30D, *Airport Field Condition Assessments and Winter Operations Safety***
- **Advisory Circular 150/5200-28F, *Notices to Airmen (NOTAMs) for Airport Operators***
- **Enhanced tool for producing RwyCCs and reporting Field Condition NOTAMs (FICON)**
 - Modified system on how surface conditions will be reported based on the RCAM criteria
 - System reduces subjectivity and standardizes how the RwyCC is generated and published
 - System calculates and generates RwyCCs based on contaminant information input by the airport operator
 - System comprised of simple dropdown menu selections for the airport operator
 - Established a demo system for testing and familiarity
 - System business rules and methods are transferrable
 - Prepared to coordinate with implementation teams
 - FAA Order 7930.2, Notices To Airmen (NOTAMs), is governing document

Awareness Campaign

- **Time is critical for a successful implementation**
 - Developed information for operators and stakeholders to use/supplement existing training and guidance documents
 - Conducted outreach nationally via webinars, conferences, industry forums and informational bulletins for airport operators and other stakeholders
 - Recorded narrated presentations on process for utilizing the RCAM for field condition assessment and reporting
 - Sought industry participation to publish articles in trade publications on field condition assessment and reporting
 - Built websites to make information available to industry and stakeholders
 - Held FAA Industry Day ahead of implementation to seek feedback and address stakeholders concerns

Challenges

- Enough time to meet implementation expectations
- Impact of change on airport operators
- Break with traditional way of assessing conditions
- Understanding use of existing friction measuring tools after implementation
- Instituting new terminology
- Applying RwyCC upgrade/downgrade actions

Best Practices

- Development of a website for information and a bank of Frequently Asked Questions
- Capability to accept/answer stakeholders on-going questions throughout implementation
- Usable template as a basic framework that can be used to train stakeholders
- Information distribution capability to reach and receive feedback from numerous stakeholders simultaneously
- Data gathering source for GRF analysis after implementation
- Organic Website

<https://www.faa.gov/about/initiatives/talpa/>



Air Traffic Controller TALPA Implementation

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ATC Guidance Documents

- **Order JO 7110.65 – Air Traffic Control**
 - Added Runway Condition Codes (RwyCC) – “0” (worst) to “6” (best)
 - Replaced “Fair” reportable braking action report with ICAO “Medium”
 - Introduced new categories: “Good to Medium” and “Medium to Poor”
- **Order JO 7210.3 – Facility Operation and Administration**
- **Order JO 7110.10 – Flight Services**
- **Aeronautical Information Manual (AIM)**
- **Aeronautical Information Publication (AIP) ICAO**
- **Pilot/Controller Glossary**

Air Traffic Controller Required Training

- **Develop Training and Training Guidance**
 - Appropriate timelines and methods must be established
 - Training and updates must be consistent state-wide
 - Recommend establishing a training framework/template for standardization
- **Brief Procedural Changes to All Controllers**
 - Terminal facilities
 - EnRoute facilities
 - Both state run and non-government facilities

Emphasize Controller Procedures Not Affected

- **Controllers will** still solicit braking action reports from pilots after/upon landing
- **Controllers will** disseminate to Airport Operators, and pilots, pertinent changes to surface/landing conditions received via PIREPS/NOTAMS
- **Controllers should *NOT*** disseminate Runway Condition Codes information via ATIS broadcasts.
- **Controllers should *NOT*** add the complete FICON NOTAMs to the ATIS broadcast.

Conclusion & Thank you!



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