DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: National Business Aviation Association (NBAA)		
1.	Para 6.5 These braking action categories provided in paragraphs 6.5.1 through 6.5.6 do not coincide with the guidance on pilot braking action reports in AIM 4−3−8. Braking Action Reports and Advisories.	NBAA requests that concurrent with the publication of this AC, FAA amend the AIM and JO 7110.65 Air Traffic Control, and the Pilot/Controller Glossary to reflect the new definitions concerning braking action.	We do not concur with the requested change and did not revise the AC. The Takeoff and Landing Performance Assessment (TALPA) Aviation Rulemaking Committee (ARC) project includes implementation of multiple products by different parts of the FAA that are on schedules specific to the product. We passed your comment and suggested change on to FAA Airports (AAS-300) and Flight Standards (AFS-200) to consider, but the schedule for publication for the different products does not support concurrent publication.
2.	Para 6.3 The AC's definition of a contaminated runway that is covered by "any depth" represents a change from the previous accepted definition of contamination depth of at least 0.125". Existing advisory data for many aircraft is based on the 0.125" depth definition, as well as the runway condition reporting criteria for the descriptor "Thin" when describing contamination depth contained in the FAA Order JO 7930.2P Notice to Airman.	Does FAA intend to alter the definition of a contaminated runway? If so, then the AC should furnish guidance on the application of advisory data based on the previous definition that a considered contaminated at depths of 0.125" or greater.	We concur with the intent of this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	Commenter: National Business Aviation Association (NBAA)		
3.	Para 7.1.2 Editorial: Missing a bullet point for NIL braking.	If it is not FAA's intent that landing performance data be furnished for NIL braking reported condition, then amend paragraph 7.1.2 to omit reference to paragraph 6.5.6. Recommend that the AC also state that data for NIL braking reports need not be furnished.	We concur with this comment. We added the following note for clarity: "**Note:** Landing performance data is not presented for Nil because this is not a performance category but rather a report from the flightcrew that flight operations should cease on this runway until the airport has taken an action to improve the braking action."
4.	Para 7.2.4 FAA should consider requiring landing performance data for weights up to maximum takeoff weight to account for possible non-normal & emergency return to takeoff airports situations.	Recommend: 7.2.4 Weights up to the maximum **takeoff** weight;	We concur with this comment. We revised the AC as requested.

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No.	Comment	Requested Change	Disposition
	Commenter: Air Line Pilots Association (ALPA)		
1.	Paragraph 7.2.7 seems unclear. The draft paragraph seems to be a reiteration of the Part 25 certification criteria when the intent is to simply provide the effects of wind on landing distance. As a pilot I simply need data to tell me how much landing distance I will need for a particular headwind or tailwind condition.	7.2.7 Winds within the approved landing operating envelope.	We concur with the intent of this comment, but did not revise the AC. Landing distance data will be supplied by data providers to the flightcrew for reported winds. The actual distance calculations provided, however, will be based on the factored winds, as noted.
2.	Although the audience for this AC are the data providers, it is helpful for flight crews to have knowledge of any assumptions used in the presentation of the data as a quality check of the landing maneuver to achieve the stated landing distance.	8.1.4. Include the procedures/assumptions used in the development of the operational landing distances. 12.3.6 Include the procedures/assumptions used in the development of the operational landing distances that can be referenced by the flight crew.	We concur and incorporated the suggested changes with minor edits.

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No.	Comment	Requested Change	Disposition
	Commenter: Bombardier Aircraft Performance Group		
1.	Recommend paragraph 6.1 on page 4 be changed as follows (to emphasize any type of water):	A runway is dry when it is neither wet nor contaminated. For purposes of condition reporting and airplane performance, a runway can be considered dry when no more than 25 percent of the runway surface area (within the reported length and the width being used) is covered by visible moisture or ~~dampness [or]~~water, frost, slush, snow (any type), or ice	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The dampness term is used here to ensure commonality with the terms used in the definition of a wet runway, which includes dampness.
2.	Recommend paragraph 6.3 on page 5 be changed as follows (to clarify water depth):	For purposes of condition reporting and airplane performance, a runway is considered contaminated when more than 25 percent of the runway surface area (within the reported length and the width being used) is covered by ~~frost~~, water that is 1/8 inch (3 mm) in depth or greater, and any depth of frost, snow, slush, or ice. Definitions for each of these runway contaminants are provided in paragraphs 6.3.1 through 6.3.8 of this AC.	We concur with the comment and the intent of the requested change. We added the following clarifying note to paragraph 6.3: "The definition of water in the context of condition reporting and airplane performance is the definition in paragraph 6.3.6 of this AC, which is a depth of greater than 1/8 inch (3 mm). This terminology is consistent with the definitions used in NOTAMs as published in AC 150/5200-28E and Order JO 7930.2Q (or later revisions)."

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3.	Recommend paragraph 6.3.8 on page 5 be changed as follows (to remove mention of water depth):	Ice that is melting or with a layer of water on top.	We partially concur. Instead, we revised the definition to read: "Ice that is melting or ice with any depth of water on top."
4.	Recommend paragraph 6.4 on page 5 be changed as follows (since no acceleration on landing):	Loose contaminants are those contaminants that an airplane's tire will not remain on the surface of without breaking through. Water, slush, wet snow, and dry snow are loose contaminants. For loose contaminants, the depth of the contaminant can affect ~~both~~ the airplane's ~~acceleration and~~ deceleration capability.	We do not concur with this comment and did not revise the AC. This is a general definition for Loose Contaminants and is common with the Takeoff Performance AC. A specific definition for loose contaminant is not necessary for landing.
5.	Recommend paragraph 6.7 on page 7 be changed as follows (since no acceleration on landing):	The runway surface condition is a description of the contaminants (if any) on the surface of a runway. Landing performance data based on runway surface condition may include the effects of contaminant depth on airplane ~~acceleration and~~ deceleration capability for loose contaminants.	We do not concur with this comment. However, we revised the definition of Runway Surface Condition so one definition can be used in both the Takeoff and Landing Performance ACs.

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6.	Recommend paragraph 6.8 on page 7 be changed as follows (since no acceleration on landing):	Solid contaminants are those contaminants that an airplane's tire will remain on top of and not break through. Compacted snow and ice are solid contaminants. For solid contaminants, the depth of the contaminant does not affect the airplane's ~~acceleration and~~ deceleration capability.	We do not concur with this comment and did not revise the AC. A specific definition of solid contaminant is not necessary for landing.
7.	BA requests guidance on how distance factors associated with abnormal landing procedures are to be applied to the time of arrival landing performance data as well as to the un-factored landing distance data in the AFM.		We concur with this comment and believe the intent is addressed in paragraph 7.4 of the AC. There will be additional information on operational issues such as applying factors in Order 8900.1 and Ops Spec 382.
8.	During the TALPA ARC discussions, it was mentioned that an operational factor of 1.15 would be applied to the calculated landing distances. The AC does not mention this operational factor. Can the FAA please clarify if the operational factor is still required and if so, how it should be applied. If still applicable, should the factor be included in the published distances, or should it be applied afterwards under the responsibility of the operator?		We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to Flight Standards (AFS-200) for consideration. The recommended operational safety factor for time-of–arrival landing distances will be in Order 8900.1 and Ops Spec 382.

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9.	Paragraph 8.2.7 on page 11	BA recommends that the FAA include a justification why a downward slope between 0% and 1% can be neglected. BA recommends that the FAA include a standardized method to correct for air distance for downhill runways slopes between 1 and 2 percent.	We do not concur with this comment and did not revise the AC. The FAA found that the 7 sec/0.96 V_{TD}/V_{APP} definitions for air distance were reasonable to account for normal issues that affect the distance from threshold to touchdown including reasonable runway slopes. (Also, the TALPA ARC part 25 sub-group was comfortable with this determination.) However, it was recognized that, in the case of runways with significant downhill slope (greater than 1%), the possibility of an extended flare is real. The FAA chose not to provide a specific method to account for the extra distance due to significant downhill slope; this flexibility allows data providers to use a method they feel is most appropriate.

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	Commenter: Bombardier Aircraft Performance Group		
10.	Table 2 on Page 14:	Runway Condition Code 5: There is no distinction between Wet Smooth and Wet Grooved Surfaces. Consideration should be given to providing credit for the improved brake coefficient on wet grooved runway surfaces if a separate analysis is acceptable to the Authority.	We do not concur with this comment and did not revise the AC. The FAA has found that grooved/PFC wet runway improved performance credit must be taken on a runway-by-runway basis. The operator is responsible for ensuring the specific runway in question is properly built and maintained according to the appropriate airport standards. It is also necessary for the operator to have the appropriate operational controls and training in place as called out in AC 121.195(d)-1A or the Airplane Flight Manual (AFM). Therefore, it is not appropriate to report via NOTAM an improved performance category, nor is it appropriate for operators to use the specific improved performance without the appropriate operational controls in place.
11.	Table 2 on Page 14:	Runway Condition Code 5: Please consider replacing Depth with Reported depth in Column 2 of Table 2.	We do not concur with this comment and did not revise the AC. The TALPA ARC Runway Condition Assessment Matrix (RCAM) has been finalized. It is desirable for Table 2 in the Takeoff and Landing Performance ACs to remain consistent with the RCAM.

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	Commenter: Bombardier Aircraft Performance Group		
12.	Table 2 on Page 14: Column 4 table 2, runway code 2:	First comment: Replace 25109(c) to 25.109(c) Second Comment, "For speeds at 85% of the hydroplaning speed[4] and above: 0.05[2].", Asterisk 2 is incorrect is incorrect: asterisk 3 seems more appropriate.	We concur with this comment. We revised the AC as requested.
13.	Paragraph 8.4.1 on page 15. BA would like to know why end of full braking configuration ends at a NLG contact point where aircraft has come to a full stop as compared to using MLG contact point. Typically, the MLG contact point is used as a reference and it is close to the center of gravity position, on which the performance calculations are based.		We do not concur with this comment and did not revise the AC. The Takeoff and Landing Performance ACs use this standard because this is the standard in AC 25-7C.
14.	Recommend paragraph 9.1.1 on page 15 be changed as follows (for the situations with water less than ⅛ of an inch):	Contaminant depths are reported in field condition reports using specific depth increments: ⅛ inch, ¼ inch, ½ inch, 1 inch, etc. Depths between ⅛ inch and ¼ inch are reported as ¼ inch; depths between ¼ inch and ½ inch are reported as ½ inch; and so on. Depths of less than 1/8 inch and where braking may be worse than wet are reported as 1/8 inch.	We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to FAA Airports (AAS-300) for consideration.

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15.	Paragraph 10.1.1 on Page 16 First sentence is not clear. ***Procedures for using reverse thrust during a landing should be consistent with normal procedures for use of reverse thrust during landing.***	BA is requesting clarification of what is meant by this sentence. BA proposes the following sentence instead: 'Procedures used to calculate the landing distance should be consistent with normal procedures for use of reverse thrust during landing.	We concur with this comment. We revised the AC as requested.
16.	Paragraph 11.3 on Page 18 Based on paragraphs 11.3, 11.3.2, guidance on existing aircraft states that JAA or EASA approved data is acceptable provided that runway slope, temperature and speed corrections be provided. Please confirm BA's interpretation of paragraphs 11.3 and 11.3.2.		BA's interpretation is confirmed.
17.	Paragraph 12.1	BA requests that reference to Computerized Airplane Flight Manual be also included as an additional location for the time of arrival landing performance data.	We do not concur with this comment and did not revise the AC. The FAA has found that the current verbiage does not specify a paper chart when referring to the AFM. The verbiage is flexible as written and can mean a computerized AFM as well as paper AFM.

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No.	Comment	Requested Change	Disposition
	Commenter: JetBlue Airways		
1.	This requested change is in accordance with the original recommendation of the TALPA ARC in categorizing differences in wheel braking coefficients and reported braking action to contaminate depths.	Change all the categorical mention of contamination depths from {**[less than 1/8”]** and **[1/8” and greater]**}, to {**[1/8” and less]** and **[greater than 1/8”]**}.	We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).
2.	This was a recommendation of the TALPA ARC per the method defined in FAR 25.109 following the logic of takeoff ASDA distance calculations on Wet Grooved and Porous Friction Course runways.	Add “Wet Skid-Resistant (Manufacturer Option)” to the RCAM matrix as a Code 6	We do not concur with this comment and did not revise the AC. A data provider may include additional operational data (beyond what is given in the AC) for use by a specific airline that has received approval for improved wet runway performance at specific airports. However, the AFM must allow for improved wet runway landing distances for operation on runways that are grooved/PFC. Typically, the AFM will include a requirement that the airline verify the runway of interest is built and maintained to a standard acceptable to the authority. The FAA is concerned about publishing anything that implies a wet grooved/PFC is better than a “Runway Condition Code 5/BA Good” that is not directly related to the specific airplane AFM, specific runways, and an approved Ops Spec. AC 121.195(d)-1A provides guidance on how approval may be obtained for wet grooved/PFC improved performance.

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No.	Comment	Requested Change	Disposition
	Commenter: The Boeing Company		
1.	Page 1, Paragraph 2.3 The proposed text states: "This material does not change or create any additional regulatory requirements, nor does it authorize changes in, **or permits deviations, from** regulatory requirements."	We recommend correcting the text as follows: "This material does not change or create any additional regulatory requirements, nor does it authorize changes in, **or permits deviations from,** regulatory requirements." Typographical correction.	We concur with this comment. We revised the document as suggested.
2.	Page 3, Paragraph 5.2 The proposed text states: "To enhance safety, procedures developed by airplane operators to assess landing performance at the time of arrival should include an adequate **safety margin** …"	We recommend including additional information on where this safety margin will be quantified. Our recommended change is needed for clarity and completeness of the AC.	We do not concur with this comment and did not revise the AC. The requested change is beyond the scope of this AC. The recommended operational safety factor for time-of-arrival landing distances will be addressed in Order 8900.1 and Ops Spec 382. We passed your comment on to FAA Flight Standards (AFS-200) for consideration.
3.	Page 4, Paragraph 6.1 This paragraph defines that a runway can be considered wet "…when more than 25 percent of the runway surface area ……..is covered by **visible moisture or dampness**….."	We recommend changing "visible moisture or dampness" to **"visible water or dampness."** The use of the word "water" instead of "moisture" will align the terminology with that used in paragraph 6.2.	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The term "visible moisture" is more inclusive

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	Commenter: The Boeing Company		
			and less confusing than the term "water" in this context.
4.	Page 4, Paragraph 6.3 The paragraph defines that a runway should be considered contaminated "…when more than 25 percent of the runway surface area (within the reported length and width being used) is covered by any depth of frost, snow, slush, ice, **or water**."	Change the highlighted text to read as follows: "or water" to **"or water with a depth of 1/8 inch (3 mm) or greater"** Paragraph 6.2 of the proposed AC states that, if the runway surface is covered by *water with a depth of that is less than 1/8th inch (3 mm),* it can be considered a wet runway. Change is needed for consistency.	We concur with the comment and the intent of the requested change. We added the following clarifying note to paragraph 6.3: "The definition of water in the context of condition reporting and airplane performance is the definition in paragraph 6.3.6 of this AC, which is a depth of greater than 1/8 inch (3 mm). This terminology is consistent with the definitions used in NOTAMs as published in AC 150/5200-28E and Order JO 7930.2Q (or later revisions)."
5.	Page 6, Paragraph 6.5 The proposed text states: "… Since the type of runway contaminant is not identified in a pilot braking action report, landing performance data based on pilot reported braking action does not include any effects of contaminant drag. …"	We recommend changing the text as follows: "… Since the type of runway contaminant is not identified in a pilot braking action report, landing performance data based on pilot reported braking action ~~does not~~ **should not** include any effects of contaminant drag. …" Our recommended change is the more appropriate (and intended) phrase.	We concur with this comment. We revised the AC as requested.

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	Commenter: The Boeing Company		
6.	Page 6, Paragraph 6.6 The proposed text states: "The runway code is a number from 0 to 6 that is used to denote the category of slipperiness of a designated portion of a runway (that is, a specific one-third of the runway), with 0 being extremely slippery and 6 being a dry runway. Since runway code reflects only the runway slipperiness (that is, any effect of contaminant drag is not included), the runway condition code can be directly correlated with a pilot-reported braking action."	The runway code is associated with either pilot-reported braking action or runway surface condition description. As stated in paragraph 6.5 the landing performance data associated with braking action should not include the effect of contaminant drag but as stated in paragraph 6.7 the landing performance based on runway surface condition may include the effects of contaminant drag. Therefore we recommend that the paragraph be changed to read as follows: "The runway code is a number from 0 to 6 that is used to denote the category of ~~slipperiness of a designated portion of a runway (that is, a specific one-third of the runway), with 0 being extremely slippery and 6 being a dry runway. Since runway code reflects only the runway slipperiness (that is, any effect of contaminant drag is not included), the runway condition code can be directly correlated with a pilot-reported braking action~~ **a designated portion of the runway (that is, a specific one-third of the runway) in accordance with the guidelines in Table 2."** Our recommended change would simplify the text.	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The requested change does not improve upon the definition, which was a product of the TALPA ARC and concurred with by the FAA.

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	Commenter: The Boeing Company		
7.	Page 6, Footnote 1 The proposed text states: "The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. Until an official change is published, the term "FAIR" **should** be used."	We recommend changing the text as follows: "The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. Until an official change is published, the term "FAIR" ~~should~~ **may** be used." Landing performance data are currently made available by some manufacturers for braking action "MEDIUM." It should not be required to re-label this data as "FAIR" in the interim period before the FAA makes an official change to "MEDIUM."	We concur with this comment. We revised the AC as requested.
8.	Page 7, Paragraph 6.7 The proposed text states: "… Landing performance data based on runway surface conditions may include the effects of contaminant depth on airplane acceleration and deceleration."	We recommend revising the text as follows: "… Landing performance data based on runway surface conditions may include the effects of contaminant depth on airplane ~~acceleration and~~ deceleration." The word "acceleration" should be removed from the sentence since there is no acceleration phase in landing performance. Our recommended change makes the text more accurate technically.	Same comment as Bombardier comment #5 on page 5. We do not concur with this comment. However, we revised the definition of Runway Surface Condition so one definition can be used in both the Takeoff and Landing Performance ACs.

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9.	Page 8, Paragraph 7.1.2 The proposed paragraph lists pilot-reported braking action.	We recommend adding "Nil" as an additional pilot-reported braking action. Our recommended change is need in order to be consistent with then pilot-reported braking actions identified in Table 2.	We concur with this comment. We revised the document by adding the following note for clarity: "**Note:** Landing performance data is not presented for Nil because this is not a performance category but rather a report from the flightcrew that flight operations should cease on this runway until the airport has taken an action to improve the braking action."
10.	Page 8, Paragraph 7.2 The proposed text states: "… The effect of each of the parameters affecting landing distance should be provided, and should take into account: …"	We recommend revising the text as follows: "… The effect of each of the parameters affecting landing distance should be provided, and should take into account **the following**: …" Our recommended change would clarify and complete the paragraph.	We concur with this comment. We revised the AC as requested.
11.	Page 8, Footnote 2 The proposed text states: "The braking action term 'FAIR' is in the process of being changed to 'MEDIUM' throughout the FAA. Until an official change is published, the term 'FAIR' should be used."	We recommend revising the text as follows: "The braking action term 'FAIR' is in the process of being changed to 'MEDIUM' throughout the FAA. Until an official change is published, the term 'FAIR' ~~should~~ **may** be used." Landing performance data is currently	We concur with this comment. We revised the AC as requested.

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		made available by some manufacturers for braking action "MEDIUM". It should not be required to re-label this data as "FAIR" in the interim period before the FAA makes an official change to "MEDIUM".	
12.	Page 8, Paragraph 7.2.4 The proposed text states: "Weights up to maximum landing weight."	We recommend revising the text as follows: "Weights up to maximum ~~landing~~ **takeoff** weight." An overweight landing (greater than maximum landing weight) may be necessary because of an enroute diversion or an immediate return to land. In these situations, an assessment of landing distance should also be required.	We concur with this comment. We revised the AC as requested.
13.	Page 10, Paragraph 8.1.3 The proposed text states: "Include allowances for any time delays that may reasonably be expected in service."	We recommend changing the text to read as follows: Include allowances for any time delays that may reasonably be expected in service **(see paragraphs 8.3.2, 8.3.3, and 8.3.4)**." Our recommended change would bring greater clarity by providing a pointer to where these delays are addressed by the AC.	We concur with this comment. We revised the AC as requested.

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	Commenter: The Boeing Company		
14.	Page 11, Paragraph 8.2.7 The proposed text states: "If the air distance is based on a time of 7 seconds at a speed of 98 percent of the recommended speed over the runway threshold, this distance is considered valid for downhill runway slopes up to 1 percent in magnitude. …" We ask what is the basis for the 1 percent downhill runway slope limitation? Since most transport category aircraft have been certificated to operate with up to 2 percent runway slope, how should the air distance be computed for runway slopes greater than 1 percent downhill? Providing this information would clarify compliance with this portion of the AC.		We do not concur with this comment and did not revise the AC. The FAA found that the 7 sec/0.96 V_{TD}/V_{APP} definitions for air distance were reasonable to account for various normal issues that affect the distance from threshold to touchdown including reasonable runway slopes. (Also, the TALPA ARC part 25 sub-group was comfortable with this determination.) However, it was recognized that, in the case of runways with significant downhill slope (greater than 1%), the possibility of an extended flare is real. The FAA chose not to provide a specific method to account for the extra distance due to significant downhill slope; this flexibility allows data providers to use a method they feel is most appropriate.

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15.	Page 13, Table 2 Table 2 provides a relationship between Runway Condition Code, Runway Surface Condition Description, and Wheel Braking Coefficient.	We recommend that a footnote be added to Table 2 explaining that "Runway Surface Condition Description" can span across "Runway Condition Codes," "Pilot-Reported Braking Actions," and "Wheel Braking Coefficients;" and is not limited to those items in the same table row as the "Description" itself. This qualifying footnote could be added to explain the variation in runway condition codes, pilot-report braking action, and wheel braking coefficients for a given contaminate type. The rationale is that "Ice" doesn't always produce a "Poor" braking action and, for example, can produce a "Medium" braking action, or have a wheel braking coefficient better than 0.08. Alternatively, "Snow" doesn't always range from "Good" to "Medium" braking action, and in some cases can produce a "Poor" braking action or wheel braking coefficients worse than 0.16. Rigid adherence to a particular row in the table based on a "description" could lead to an inappropriate braking action or braking coefficient.	We do not concur with this specific comment. However, while reviewing this item, we determined the AC could be improved by clarifying the source of the recommended wheel braking coefficients. We added the following note above table 2 of the AC: "**Note:** The wheel braking coefficients in table 2 of this AC were determined by the TALPA ARC part 25 working group, based on their experience and accepted performance levels on different surfaces as defined by aircraft certification agencies (EASA). They were verified to the greatest degree possible by the latest industry flight testing as embodied by the Joint Winter Runway Friction Program, which was active from 1995 to 2004. This AC may be revised if future industry-level acceptance of new information becomes available."

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16.	Page 13, Table 2, Footnote 2 The proposed text states: "The braking action term 'FAIR' is in the process of being changed to 'MEDIUM' throughout the FAA. Until an official change is published, the term 'FAIR' should be used."	We recommend revising the text as follows: "The braking action term 'FAIR' is in the process of being changed to 'MEDIUM' throughout the FAA. Until an official change is published, the term 'FAIR' ~~should~~ **may** be used." Landing performance data is currently made available by some manufacturers for braking action "MEDIUM". It should not be required to re-label this data as "FAIR" in the interim period before the FAA makes an official change to "MEDIUM".	We concur with this comment. We revised the AC as requested.
17.	Page 13, Table 2, Footnote 3 The proposed text states: "… Airplanes without anti-skid system will need to be addressed separately on a case-by-case basis."	We recommend that airplanes without anti-skid systems be considered equivalent to an anti-skid on-off system. Our recommendation is a reasonable approach that will avoid review and assessment for possibly multiple airplane models.	We do not concur with this comment and did not revise the AC. The FAA has found that the current guidance is adequate and consistent with TALPA ARC recommendations. This change should be submitted for consideration for a future revision to AC 25-7C.

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No.	Comment	Requested Change	Disposition
	Commenter: The Boeing Company		
18.	Page 14, Paragraph 9.1.1 The proposed text states: "Contaminant depths are reported in field condition reports using specific depth increments: 1/8 inch, ¼ inch, ½ inch, 1 inch etc. Depths between 1/8 inch and ¼ inch are reported as ¼ inch; depths between ¼ inch and ½ inch are reported as ½ inch; and so on."	We recommend that the paragraph be expanded to summarize all the depth reporting information from JO 7939,2P rather than "and so on", or alternatively change the paragraph as follows: "Contaminant depths are reported in field condition reports using specific depth increments~~: 1/8 inch, ¼ inch, ½ inch, 1 inch etc. Depths between 1/8 inch and ¼ inch are reported as ¼ inch; depths between ¼ inch and ½ inch are reported as ½ inch; and so on~~ **as specified in FAA Order JO 7930.2P (or later revision)**." Our recommended change would improve the content of paragraph. A similar reference to JO 7930.2P is also made in Paragraph 9.3.	We concur with this comment. We revised the AC as requested.

DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: Embraer S. A.		
1.	Item 6 - Definitions This item should be modified in the AC, in order to add the definitions of "wheel braking coefficient" and "aircraft braking coefficient".	Add the definitions of "wheel braking coefficient" and "aircraft braking coefficient".	We partially concur with this comment. We do not concur with defining "aircraft braking coefficient" because this phrase is not used in the document. However, we concur with including a definition of wheel braking coefficient and revised the document to include the following definition: "**Wheel Braking Coefficient.** Wheel braking coefficient is the ratio of the deceleration force from a braked wheel/tire relative to the normal force acting on the wheel/tire. The wheel braking coefficient is an all-inclusive term that incorporates effects related to the tire-to-ground interaction from braked wheels only, such as runway surface and airplane braking system (e.g., anti-skid efficiency, brake wear, tire condition, etc.). For the purposes of this AC, the wheel braking coefficient is based on a fully modulating anti-skid controlled braked wheel/tire. The definition of fully modulating anti-skid system is found in AC 25-7C."

DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: Embraer S. A.		
2.	Item 6.5 - Pilot-Reported Braking Action. Clarify the philosophy between good/medium/poor PIREPs, which helps to maintain the consistency of data generated for operation.	Clarify the philosophy between good/medium/poor PIREPs, according to the rationale of ARC 25.125 (B)(c)(3)(iii), which contains the following text: "Historically the level associated with good has been described by the manufacturer who supplies this data as consistent with a wet smooth runway. Medium has been defined by that manufacturer as a runway with ½ the Good capability. Poor ½ the medium capability. While these levels are not explicitly being adopted as an industry standard, the recommended standard does result in performance that is relatively consistent with this philosophy."	We do not concur with this comment and did not revise the AC. The FAA has found that the comment referred to a discussion in the rationale section of the TALPA ARC submission for § 25.125. The intent of including this discussion in the rationale is as an explanation of the historical philosophy behind the assignment of braking levels to braking action terminology by the only manufacturer who had presented data based on braking action prior to the advent of the TALPA ARC. The TALPA ARC part 25 working group considered this method but choose a different method of determining wheel braking coefficients for a given braking action/runway condition code.

No.	Comment	Requested Change	Disposition
	Commenter: Embraer S. A.		
3.	Table 2 - Runway Surface Condition – Pilot Reported Braking Action	Change the title "wheel braking coefficient" to "wheel/aircraft braking coefficient", as in ARC 25.125 recommendation.	We do not concur with this comment and did not revise the AC. All the referred to information in the column labeled "wheel braking coefficient" is based on a wheel braking coefficient except for the dry runway definition, which depends on the specific manufacturer's method. We believe the statement in this specific box is general enough for manufacturers who use an airplane braking coefficient to understand the intent of the guidance.
4.	Table 2 - Runway Surface Condition – Pilot Reported Braking Action Based on comment above, Embraer suggests to identify which coefficients are "wheel braking coefficients", as in ARC 25.125 recommendation	Identify which coefficients are "wheel braking coefficients", as in ARC 25.125 recommendation	See Embraer comment #3 above.

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Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: Embraer S. A.		
5.	Table 2 - note 1 As stated in SAFO 06012 - item 5.f, the 25.125 certified braking coefficient seems to be inadequate to represent a typical operation. This suspect is based on current certification procedures, mainly the possible use of (1) runway favorable condition to get a better braking coefficient and (2) pilot braking effort, getting maximum pedal deflection quickly and maintaining it up to aircraft stop. In a typical landing the runway condition isn't the most favorable and pilot braking is softer than maximum, to guarantee passengers comfort. Given this context, to get the credit of 100% dry capacity, one should demonstrate that conditions (1) and (2) were satisfied, based on a clear criteria of what is a "representative runway condition" and what is a "representative braking".	Create criteria to evaluate runway condition and pilot braking effort.	We do not concur with this comment and did not revise the AC. The TALPA ARC part 25 working group was aware of the verbiage the writer presents. They chose to limit note 1 to characteristics of the runway section used for the dry runway certification demonstration. The FAA concurs with TALPA ARC recommendation.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
1.	4 BACKGROUND 4.3 This AC, in addition of AC91-79A, should normally supersede SAFO 06012	Assume a comment not a requested change but just a comment.	We acknowledge the comment, but no change to this AC is necessary. The FAA TALPA implementation plan includes specifying that Safety Alert for Operators (SAFO) 06012 is superseded. We forwarded your request to Flight Standards (AFS-200) for action at the appropriate time.
2.	5.5 This definition is too specific to demonstration. It would be clearer to use instead TALPA-ARC definition for time of arrival landing distance, i.e. "The horizontal distance required to land and come to a complete stop starting at the runway threshold at the planned approach speed"		We partially concur with this comment. For clarity and correctness, we concur with removing the parenthetical phrase "(treated as a horizontal plane through the touchdown point)." However, we do not concur with changing the rest of the definition because this may lead to an interpretation that an assumed threshold height for the landing distance calculation, which is lower than 50 feet, is acceptable. Assuming the airplane is at a height of 50 feet at the start of the calculation is appropriate and consistent with historical standards. It should be noted the TALPA ARC did recommend that, through the operational approval process, the operator could petition to use data based on a shorter air distance and, therefore, presumably a lower threshold height. However, to do this, it is expected the operator will have additional training and operational controls in place, and that this

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
			reduced air distance would only be used at specific airports where the approach guidance is conducive to this earlier touchdown.
3.	6.1 Dry Runway The criterion of 25% coverage is consistent with JO7930.2P, that advises the use of the term PATCHY to describe contamination below 25% of the entire runway surface, and with the IR-OPS definition of a contaminated runway. However, it has been demonstrated that a dry runway computation including applicable margins is insufficient to predict landing performance on a runway where icy patches are concentrated in a single location. Example (Based on A320 CFM simplified simulation): Approach speed 130kt, Autobrake med (0.3g), SL, ISA, no wind, full reverse reduced to Rev Idle at 60kt, landing compliant with TALPA/ARC OLD model, the A/C will overrun the runway at around 35kt (with last quarter fully covered with ice). It has been found that neglecting up to 25% of contamination on the runway is acceptable only if this contamination is distributed evenly between the three thirds of the runway. The ICAO Friction Task Force has thus proposed a coverage criterion that considers a runway		We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The 25 percent criterion was discussed extensively by the TALPA ARC. Changing the definition as requested would require a change to FAA guidance related to the TALPA ARC recommendations, and would potentially have a significant negative impact on aircraft operators.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
	contaminated if the coverage exceeds 25% in one of the runway thirds. This also applies to §6.2 and 6.3.		
4.	6.1 Dry Runway It is suggested to not refer to frost, slush, snow or ice which are defined later, but to stick to the ICAO Friction Task Force proposed definition of a dry runway, i.e.: "**Dry runway**. A runway is considered dry if its surface is not wet or contaminated and free of visible moisture within the area intended to be used"	Airbus suggests to change the definition of dry run as followed: "6.1 **Dry runway**. A runway is considered dry if its surface is not wet or contaminated and free of visible moisture within the area intended to be used."	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The requested change does not improve upon the definition, which was a product of the TALPA ARC and concurred with by the FAA.
5.	6.2 Wet Runway The first sentence of this definition is a circular definition with DRY and is unnecessary.	Airbus proposes to delete that sentence.	We do not concur with this comment and did not revise the AC. Same justification as comment above.

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No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
6.	6.2 Wet Runway Regarding the 1/8 inch (3mm) threshold, Airbus would like to highlight that it does not represent today's practice that is more "less than or equal to 3mm", and that harmonization with ICAO Friction Task Force conclusions should be considered		We concur with this comment and changed the wet runway definition to "…any visible dampness or water that is 1/8″ or less in depth, which is consistent with historical standards and the TALPA ARC recommendation.
7.	6.3.8 Wet Ice The thickness of the layer of water on ICE has no impact on its slipperiness. It is not clear whether this definition implies that above 3mm a runway in this state would have to be considered as flooded only, which would seem non-conservative.	Airbus suggests using the definition of ICAO Friction Task Force for wet ice, i.e.: "**Wet ice**. Ice with a layer of water on top of it or ice that is melting. Note: Freezing precipitation can lead to runway conditions associated with wet ice from an aeroplane performance point of view."	We partially concur. Instead, we revised the definition to read: "Ice that is melting or ice with any depth of water on top."
8.	6.6 Runway Condition Code	The runway condition code can also be directly correlated with the runway surface condition. It is suggested to modify the text accordingly.	We do not concur with this comment and did not revise the AC. The relationship to runway surface condition presented in the matrix is a starting point for the original assessment. The runway condition code (RCC) that results from when airport personnel make the assessment may no longer be the same. For example, when the airport assessor is finished with the assessment, he may have downgraded a snow covered runway from an RCC of 3 to an RCC of 1.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
9.	7.1 It is recommended that the FAA, in line with future ICAO standards, adopts a basic set of data published as a function of the Runway Condition Code, with an acceptable option to provide Contaminant Type and Depth data when neglecting the contaminant drag proves too penalizing for a given airplane design. It would help clarity if the basic set of performance was the one published for the Runway Condition Code, with the other input parameters (Contaminant Type and Depth and Pilot Reports of Braking Action) being correlated in a objective manner with it. Two sets of performance introduce complexity and will confuse flight crew. This does not prevent the option of splitting the performance for Runway Condition Codes 2 and 3 into several, depending on loose contaminant density and depth to account for contaminant drag. Winter contaminants occur only at relatively low temperatures and performance has thus historically been provided for a more limited operational domain than that approved for dry runway operations. It is suggested that the valid temperature range		We did not change the AC in response to this comment. As this AC contains recommendations and not requirements, the data provider is free to provide the data in any format they choose. We do not concur that the publication of runway condition codes for landing with depth adds clarity. Keeping depth associated with contaminant type as opposed to runway condition codes keeps a clean separation between an assessment (Runway Condition Code) and the reporting of observed type and depth. We concur that winter contaminants only occur at lower temperatures (40 °F/4 °C and below typically). If data providers decide to provide landing data based on contaminant type and depth, it would be expected that they would use good judgment in deciding the temperature range to be covered. If they choose to not provide specific performance data for winter contaminants above 40 °F/4 °C because it environmentally cannot occur, this would still be considered coverage over the operational envelope.

<table>
<tr><th>No.</th><th>Comment</th><th>Requested Change</th><th>Disposition</th></tr>
<tr><td></td><td colspan="3">Commenter: Airbus</td></tr>
<tr><td></td><td>for which performance data is provided may be restricted by the data provider in case of winter contaminants.</td><td></td><td></td></tr>
<tr><td>10.</td><td>7.1.1

Table 1

As the intent of this table is to differentiate solid from loose contaminants, then dry and wet should be removed from the table (not contaminant types).

Airbus also recommends including in table 1 the loose contaminant specific gravities and depth ranges according to information contained in TALPA-ARC report for landing (ARC 25.125 Rule proposal Document rev(13)3-25.doc p2.12) or EASA AMC25.1591 §5.1.

For consistency reasons with the take-off AMC 25-X, it is also recommended to add another paragraph as follows:

“For loose contaminants, data should be supplied for the reportable contaminant depths identified in FAA Order JO 7930.2P (or later revision) up to the maximum contaminant depth for each of these contaminants. Due to issues of potential structural damage from spray impingement and engine ingestion, the recommended</td><td>Airbus suggests to remove dry and wet from the table.

Please also add the following paragraph:

“For loose contaminants, data should be supplied for the reportable contaminant depths identified in FAA Order JO 7930.2P (or later revision) up to the maximum contaminant depth for each of these contaminants. Due to issues of potential structural damage from spray impingement and engine ingestion, the recommended maximum depths for landing operations for loose contaminants are those provided in Table 1.”</td><td>We partially concur with this comment and revised the document.

We do not concur that the intent of table 1 is to differentiate between solid and loose contaminants. Rather, the intent is to provide the runway surface condition descriptions for which data should be provided. Therefore, “dry” and “wet” should remain in the table.

However, we concur that the assumed specific gravity information should be in the AC. Instead of adding it to table 1, we added a new paragraph 9.4 and table 3 as follows:

9.4 If the effect of contaminant depth is included in the landing distance data, then data should be provided for the specific gravities in the table 3 of this AC.

Table 3. Loose Contaminant Specific Gravity
<table><tr><th>Runway Description</th><th>Specific Gravity</th></tr><tr><td>Dry Snow</td><td>0.2</td></tr><tr><td>Wet Snow</td><td>0.5</td></tr><tr><td>Slush</td><td>0.85</td></tr></table></td></tr>
</table>

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
	maximum depths for landing operations for loose contaminants are those provided in Table 1."		<table><tr><td>Standing Water</td><td>1.0</td></tr></table> We also concur with including the maximum recommended depths of slush and standing water. We added the following note to paragraph 9.3: "**Note:** Due to issues of potential structural damage from spray impingement and engine ingestion, the maximum recommended depths for landing operations for loose contaminants of slush and water are 0.5" (13 mm) unless greater depths are demonstrated to be free of structural damage and engine ingestion issues."
11.	8.1.2 To allow for alternative means of compliance by demonstration, it might be beneficial to change "…assessment is determined…" in the first sentence, into "…assessment may be determined…".	In the first sentence, Airbus suggests to replace "…assessment is determined…" by "…assessment may be determined…"	We concur with this comment. We have revised the AC as requested.

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No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
12.	8.2.1 The criterion of 50ft at threshold is irrelevant to the determination of the air distance as per 8.2.4. It is proposed to replace "from a height of 50 feet above the landing surface to the point of main gear touchdown" with "from runway threshold to the point of main gear touchdown".	Airbus suggests to replace "from a height of 50 feet above the landing surface to the point of main gear touchdown" with: "from runway threshold to the point of main gear touchdown"	We partially concur with the comment, but did not revise the AC. We concur with the thought process that the important factor is that the air distance definition starts at the threshold. However, we do not concur with removing the reference to 50 feet at the threshold. The FAA has found that it is important to maintain the concept of a 50-foot threshold height when determining the air distance used in the calculation by test. This supports the possibility that the applicant uses a test method consistent with the recommendation in paragraph 8.2.5 of the AC.
13.	AC25-7D is unknown. Only AC25-7C is.		We concur and changed the AC to reference "AC 25-7C." Issuance of AC 25-7D has been delayed and will not likely be issued before this AC is issued.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
14.	8.2.4 To enhance the understanding of the intent, it may be useful to modify the text.	Airbus suggests to replace: "over a time period of 7 seconds at a speed of 98 percent of the recommended speed over the landing threshold, also referred to as the final approach speed (VAPP). This represents a flare time of 7 seconds and a touchdown speed (VTD) of 96 percent of VAPP." By: "over a time period of 7 seconds from the threshold crossing until main gear touchdown with a touchdown speed (VTD) of 96 percent of the final approach speed (VAPP) (Ground speed based)"	We do not concur with this comment and did not revise the AC. The FAA has found that the current text provides an unambiguous interpretation of how the air distance should be computed. The suggested modification allows for a possible interpretation of a more than linear speed reduction and therefore a reduced air distance as compared to the intent. We do not see a need to add the parenthetical (ground speed based) to the existing paragraph.
15.	8.2.5.2 As per above comment of §5.5 and §8.2.1, there is no need to refer to "a height of 50 feet above the runway surface", which should be replaced by "runway threshold crossing".		We partially concur with the comment, but did not revise the AC. We concur with the thought process that the important factor is that the air distance definition starts at the threshold. We do not concur with removing the reference to 50 feet at the threshold. The FAA has found that it is important to maintain the concept of a 50 feet threshold height when determining the air distance used in the calculation by test. This supports the possibility that the applicant uses a test method consistent with the recommendation in 8.2.5.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
16.	8.2.6 As written, this statement permits disregarding the standard deviation in determining flare distance and touchdown speed as agreed for certified autoland distances. Such an option was considered by Airbus in constructing the advisory distances for time of arrival, and dismissed as considering the average distance and speed only would be very non-conservative in a significant amount of scenarios. The FAA should require the same airborne distance and transition phase initiation for autoland as in the certificated automatic landing distances.	Airbus proposes to modify the text of §8.2.6 as follows: "The air distance determined under paragraph 8.2.4 or 8.2.5 of this AC also applies to autoland or similar low visibility guidance systems as long as the agreed unfactored landing distance for autoland does not exceed the manual landing distance. If it does exceed the manual landing distance, then the agreed unfactored landing distance for autoland should be used for autoland and/or low visibility guidance system"	We do not concur with this comment and did not revise the AC. The FAA does not require the determination of an air distance for the autoland distance calculation in AC 120-28D. The FAA guidance on landing distance increase to be used for autoland is limited to factors that are applied to the normal dispatch operating distances. The method recommended in section 8.2.6 is what the TALPA ARC recommended for addressing time-of-arrival autoland considerations. It was recognized that the result based on the prescribed method might not cover all eventualities just like the manual landing air distance based on 7 seconds, as recommended by the AC or the factors recommended in AC 120-28D, might not cover all the eventualities.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
17.	8.2.7 In the future, the AC should provide means of demonstrating that the method chosen by the data provider to produce airborne distances for downhill runway slopes in excess of 1% is valid.		We do not concur with this comment and did not revise the AC. The FAA found that the 7 sec/0.96 V_{TD}/V_{APP} definitions for air distance were reasonable to account for various normal issues that affect the distance from threshold to touchdown including reasonable runway slopes. (Also, the TALPA ARC part 25 sub-group was comfortable with this determination.) However, it was recognized that, in the case of runways with significant downhill slope (greater than 1%), the possibility of an extended flare was real. The FAA chose not to provide a specific method to account for the extra distance due to significant downhill slope; this flexibility allows data providers to use a method they feel is most appropriate.
18.	8.3.1 In line with the comment to 8.2.4 above, insert "(ground speed based)" after "the speed at the start of the transition segment is 96 percent of the final approach speed"	Airbus proposes to modify the text as follows: " … the speed at the start of the transition segment is 96 percent of the final approach speed (ground speed based)"	We do not concur with this comment and did not revise the AC. The FAA has found that there is no need to add the parenthetical (ground speed based) to the existing paragraph.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
19.	8.3.5 In order to be consistent with AC25-7C Figure 19-1 "Landing Time Delays", it is proposed to add an additional paragraph just after 8.3.5.	Airbus suggests to add the following paragraph: "8.3.6 In case of more than one deceleration device not automatically activated, accountability will be performed sequentially with the longer of 1 sec or the demonstrated time between 2 successive pilot actions".	We do not concur with this comment and did not revise the AC. The FAA believes the combination of paragraphs 8.3.4, 8.3.5, and 8.3.6 adequately cover the recommended deceleration device scenarios. These paragraphs are consistent with part 25 work group TALPA ARC submittal.
20.	8.3.6 Table 2 For consistency reason with ICAO Friction Task Force conclusions, it is suggested to replace in the runway surface condition description "Ice" by "Ice (dry and cold)".	In Table 2, Airbus suggests to replace in the runway surface condition description "Ice" by "Ice (dry and cold)"	We do not concur with this comment and did not revise the AC. The current FAA definitions of Ice and Wet Ice are adequately descriptive.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
21.	8.3.6 Table 2 Compared to TALPA-ARC table (ARC 25.125 Rule proposal Document rev(13)3-25.doc page 2.16), reference to "Wet-skid resistant" runways (i.e. PFC/Grooved) are not addressed. When dispatching with a specific performance credit granted by the Authority for the landing performance at Dispatch towards the considered RWY, when WET, based on friction defined in Part 25.109(d) or equivalent data from flight tests, it may not be possible to land at destination if performing an in-flight landing performance assessment with the standard friction of WET / GOOD. Even if this credit at Dispatch is not to-day considered by FAA, for well-known reasons, it might be in the future (for example: if a US operator operates in LONDON CITY).	Airbus suggests keeping this provision (between runway code 6 and 5): - as a manufacturer option in table 2 of the AC, with "Per method defined in Part 25.109(d)" in the wheel braking coefficient column, - explicitly restricted to when a specific performance credit has been granted by the Authority for the landing performance at Dispatch towards the considered RWY, when WET, based on friction defined in Part 25.109(d) or equivalent data from flight tests on PFC/Grooved runways.	We do not concur with this comment and did not revise the AC. A data provider may include additional operational data (beyond what is given in the AC) for use by a specific airline, which has received approval for improved wet runway performance at specific airports. However, the AFM must allow for improved wet runway landing distances for the operation on runways that are grooved/PFC. Typically, the AFM will include a requirement that the airline verify the runway of interest is built and maintained to a standard acceptable to the authority. The FAA is concerned about publishing anything that implies a wet grooved/PFC is better than a "Runway Condition Code 5/BA Good" that is not directly related to the specific airplane AFM, specific runways, and an approved Ops Spec. FAA AC 121.195(d)-1A provides guidance on how approval may be obtained for wet grooved/PFC improved performance.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
22.	8.4.1	For simplicity reason, and in order to avoid useless over-precision, it is suggested to replace "forward contact point of the airplane's nose gear tires when the airplane comes to a stop" with "nose gear position when the airplane comes to a stop"	We concur with this comment. We have revised the AC as requested.
23.	11 GUIDANCE FOR EXISTING TYPE DESIGNS This AC provides methods for generating data from first principles, but does not address the situation where the historical data available does not allow the data provider to implement these methods at a reasonable cost and effort. SAFO 06012 provided generic factors to be applied to dry runway factored landing distances for contaminated conditions. These were already found inappropriate during the TALPA ARC and a note with updated generic factors was proposed.		We do not concur with this comment as it is beyond the scope of this AC. We passed your comment to FAA Flight Standards (AFS-200) for consideration. Optional factors that may be applied against the unfactored § 25.125 landing distance in lieu of time-of-arrival landing data using this AC will be in Order 8900.1 and Ops Spec 382.
24.	11.3.1	Airbus suggests replacing "You should develop data…" by: "The data provider should develop data…"	We concur with this comment. We revised the AC as requested.

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No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
25.	11.4	Airbus suggests replacing "However, you should not use reverse thrust credit..." by: "However, reverse thrust credit should not be used…"	We concur with this comment. We revised the AC as requested.
26.	12.1	Airbus suggests replacing "You may furnish…" by "The data provider may furnish…"	We concur with this comment. We revised the AC as requested.

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No.	Comment	Requested Change	Disposition
	Commenter: Four Winds Consulting		
1.	While the AC is directed at those who provide reference data, the safety hazards addressed will cover a wide area of operational relationships. Since the initial formation of the TALPA ARC, a great deal of attention has been paid to the economic and engineering aspects of the issue. The validation of the data however has relied on subjective pilot reports. For reference, the following braking coefficient values were reported by the state investigation agencies for these contaminated runway related accidents: 1982 World Airways 0.08 1996 Travel Airways Scandinavia 0.05 2005 SWA Midway 0.08 2009 AA Kingston Jamaica 0.08 2012 ANA Shonai 0.08 Most of these occurred at or around the point where contamination was considered 2-3mm and braking action good.	Please ensure any use of the word “thin” is discontinued from any standardized taxonomy associated with the RCAM	We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to FAA Airports (AAS-300) for consideration.

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No.	Comment	Requested Change	Disposition
	Commenter: Four Winds Consulting		
2.	Safety theory must also play a role in this guidance. There is a large science devoted to change management and the risks that are created when complex interactions between units takes place. The limitations of airport operators to provide quality assured observations free from bias are essential to take into account. Clear language and training guidance are as important as engineering factors. Airports must be able to train, observe, and communicate information vital to the RCAM. The procedures must be intuitive and readily communicable without undue conditions that may corrupt the data.	Please limit the observations required by the airport to: 1/8th inch or less 1/2 inches or less. Etc.	We do not concur with this comment and did not revise the AC. Same justification as comment #1 on page 41.

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Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: Textron Aviation		
1.	Page/paragraph: Multiple AC 25-7D has not yet been released, yet is referenced multiple times in this document.	If AC 25-7D is not released before the release of this AC 25-X, consider referencing AC 25-7C instead.	We concur and changed the AC to reference "AC 25-7C." Issuance of AC 25-7D has been delayed and will not likely be issued before this AC is issued.
2.	Page 4, Para 6.3 Taken literally, the definition for contaminated runway contradicts the definition for wet runway. Wet runway is neither dry nor contaminated, and consists of less than 1/8 inch (3mm) of visible dampness or water. Here contaminated is specifically defined as having any depth of water.	"For purposes of condition reporting and airplane performance, a runway is considered contaminated when more than 25% of the runway (within the reported length and the width being used) is covered by any depth of frost, snow, slush, or ice, or by 1/8 inch (3 mm) or more of water."	We concur with the comment and the intent of the requested change. We added the following clarifying note to paragraph 6.3: "The definition of water in the context of condition reporting and airplane performance is the definition in paragraph 6.3.6 of this AC, which is a depth of greater than 1/8 inch (3 mm). This terminology is consistent with the definitions used in NOTAMs as published in AC 150/5200-28E and Order JO 7930.2Q (or later revisions)."

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	Commenter: Textron Aviation		
3.	Page 7, Para 6.7 The definition for Runway Surface Condition is worded differently than the corresponding definition in the draft AC 25-X "Takeoff Performance Data for Operations on Contaminated Runways". In this draft, this definition refers to acceleration and deceleration capability, while the other draft AC 25-X speaks to effects on braking friction and drag specifically. Suggest rewording for clarity, with the other draft AC. and to be consistent with the other draft AC.	Change the second sentence to read: "Landing performance data based on runway surface condition may include the effects of the contaminant on braking friction, and the effects of contaminant depth on drag."	We do not concur with this comment. However, we revised the definition of Runway Surface Condition so one definition can be used in both the Takeoff and Landing Performance ACs. See Bombardier comment #5 on page 5.
4.	Page 10, Para 8.2.1 The Note at the end of paragraph 8.2.1 only identifies § 121.195(b) which is specific to turbine-engine powered transport category airplanes operating under 14 CFR 121 rules. While the referenced AC25-7D is not yet available, AC25-7C also includes § 121.195(c), § 135.385(b), (c), or (f), or equivalent. Suggest updating the note include all rules identified in the AC.	"AC 25-7D states the air distance computed using the parametric method should only be used in conjunction with the operational safety margins required by § 121.195(b) or (c), § 135.385(b), (c), or (f), or equivalent."	We concur with this comment. We revised the AC as requested.

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5.	Page 10, Para 8.2.2 This paragraph implies that all performance data determined under § 25.125 uses the parametric method of determining air distance, using a -3.5° approach angle and 8 f/s touchdown rate. As was discussed during the ARC, there are manufacturers that provide realistic air distances, based on flight test data flown using the same procedures the operators are instructed and trained to use in normal operations, without operational distance factors. Suggest striking the parenthetical phrase referring to 1 to 4 feet per second touchdown rates, as this was not part of the TALPA ARC recommendations and does not accurately reflect the full range of airplane types and operations that would be covered by this AC. The last two sentences also appear to be stereotypical and not reflective of all TC applicants. Certified published landing performance is normally based on the worst test point obtained, not the maximum capability of the airplane. To state that all flight tests for landing distance are conducted in "relatively pristine conditions" is not only subjective, but also untrue. The fact that flight tests are conducted by a flight test pilot is required by regulation, and those	"There are a few of reasons why the landing distances determined under § 25.125 might be shorter than the distance that the average pilot is likely to achieve in normal operations. First, the parametric method of determining the air distance presented in AC 25-7D, used by some manufacturers to provide landing distance in their AFMs, allows the air distance to be based on a steeper-than-normal approach angle of -3.5°, followed by a flare in which the touchdown rate of descent can be as high as 8 feet per second. Second, the § 25.125 distance is based on beginning at a speed of VREF, whereas the operating procedures may recommend a higher speed, particularly when headwinds are present."	We concur that the statement could give the impression that all certified landing distance demonstrations are the same, which is not true. Type Certificate holders that provide unfactored data in their AFMs may use a different method than the large airplane manufacturers who typically use the parametric method. We revised paragraph 8.2.2 as requested with the exception that air distance was substituted for landing distance in the initial sentence: "There are reasons why the air distance determined under § 25.125 might be shorter than the distance the average pilot is likely to achieve in normal operations. First, the parametric method of determining the air distance presented in AC 25-7D, used by some manufacturers to provide landing distance in their AFMs allows the air distance to be based on a steeper-than-normal approach angle of -3.5°, followed by a flare in which the touchdown rate of descent can be as high as 8 feet per second. Second, the § 25.125 air distance is based on beginning at a speed of V_{REF}, whereas the operating procedures may recommend a higher speed, particularly when headwinds are present. Third, the philosophy followed by some manufacturers during the

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	flight test pilots are making compliance findings to the effect that the landings do not require exceptional piloting skill or alertness. To state otherwise implies a non-compliance with § 25.125. Passenger comfort is again subjective, and may be a secondary concern for operations into short fields.		certification process is to determine the maximum capability of the airplane."
6.	Page 11, Para 8.2.5 Paragraph 8.2.5.3 should be deleted, as it is contrary to the recommendations provided by the TALPA ARC. During the course of the ARC, it quickly became apparent that there was a wide range of air distance models and techniques used by the various manufacturers. Some, as indicated by this draft AC 25-X, used the parametric method and assumed a -3.5° approach and 8 ft/s touchdown rate. Others used a fixed air distance (for example, 1000 ft) which was generally regarded as being optimistic, particularly for larger airplanes with higher threshold speeds. The proposal to use a 7 second air time and 98% threshold speed was an attempt to provide a more reasonable air distance to be used for those airplanes that do not have flight test data representative of normal procedures. However, there are manufacturers that	Delete paragraph 8.2.5.3 and the following note.	We do not concur with this comment and did not revise the AC. The part 25 landing submittal of the TALPA ARC states: "Advisory Material will need to define what conditions and requirements are necessary to obtain an alternate method. For example: a method that reasonably represents the intended operation of the airplane." Paragraph 8.2.5.3 is the advisory material that is referred to in the submittal. This paragraph is an alternate means of obtaining an air distance and presumably would only be used if the applicant was attempting to obtain a shorter air distance than that recommended in paragraph 8.2.3. If this is the case, then demonstrating the landing based on parameters that are more representative of normal flight training is

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	conduct landing flight tests using the same techniques and procedures that are specified in the Airplane Flight Manual, and which are routinely used by 14 CFR Part 91 operators without any additional factors or pads. The resulting air distances were determined in accordance with the accepted means of compliance in AC 25-7x (e.g. AC 25-7C 19 b (2)). The ARC recommendation specifically stated that the air distance could be based on "the manufacturer's recommended and demonstrated techniques" in order to capture these manufacturer's methods. The arbitrary 1-4 ft/s touchdown rate restriction included in this draft was not a recommendation of the ARC, and is unsubstantiated and unnecessary, given the operational history of those aircraft using landing distances based on measured air time and distance, without additional factors. To include this criterion would limit current operations where no safety issue has been identified. It should also be pointed out that using the AC 25-7 air distance method, flown with a 3° approach and allowing up to 6 ft/sec touchdown rate, was shown to produce longer air distances on some models than those which would result from using this draft guidance.		necessary. Also, individual operators have a way to obtain shorter landing distances via Order 8900.1 and Ops Spec 382.

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7.	Page 13, Table 2 A couple of the footnote references are incorrect in the Wheel Braking Coefficient column for 1/8" or greater Water and Slush. The wheel braking coefficient value of 0.16 in (1) should have a reference to footnote 3. The wheel braking coefficient of 0.05 in (2) should have a reference to footnote 3, not 2. Also, the reference to § 25.109(c) is missing a period.	(1) For speeds below 85% of the hydroplaning speed[4]: 50% of the wheel braking coefficient determined in accordance with § 25.109(c), but no greater than 0.16[3]; and (2) For speeds at 85% of the hydroplaning speed[4] and above: 0.05[3]. "Wherever the data is provided, label the data as "Advisory Data Only" or use similar wording."	We partially concur with this comment. We incorporated all the changes, except for the note in (2) specifying to label the data as advisory only.
8.	Page 18, Para 12.2 As many manufacturers have been providing contaminated runway performance in an advisory capacity for a number of years, there have likely been numerous ways of labeling or identifying this data as advisory. Suggest a minor wording change to this paragraph to convey the intent without specifying a specific label.	"Wherever the data is provided, label the data as "Advisory Data Only" or use similar wording."	We concur with this comment. We revised the AC as requested.

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9.	General	There are a number of items proposed in this draft AC that appear to have the intention of addressing shortcomings with AC25-7x, and the data created to show compliance to § 25.125. Examples of this are the proposal to use 90% of the dry braking mu for dry runway performance (even though no specific safety concerns were identified with existing dry runway landing data) and redefining the time delays for deceleration devices during the transition segment. While there was much resistance expressed during the TALPA ARC to change existing § 25.125 regulations or guidance used for dispatch assessments, addressing these items in AC 25-7x seems a more reasonable approach. It is feared that proposing changes like these in this draft AC will ultimately cause AC25-7x landing guidance to stagnate, and ultimately lead to the requirement to provide two distinct sets of landing data which may grow further apart in time.	We do not concur with this comment and did not revise the AC. The Part 25 work group submittal for the TALPA ARC stated: "The recommended level of 90% of the dry runway capability is intended to account for the possible degradation due to the operational runway as compared to the runway used in flight test, if you will the selection of runway surface for flight test that is free of paint, heavy rubber build up etc. It is known and has been acknowledged that at times manufacturers have repeated tests or gone to different runways to achieve better results. The FAA has an additional concern that in line operations that on a dry runway on airplanes with high deceleration capability that maximum braking is not used. In general the group was not concerned as especially with the bigger airplanes it wasn't felt the time of arrival assessment will be onerous on normal dry runway observations." We understand the concern expressed in the comment, but for the majority of the part 25 TALPA working group this was not a concern. To address the part 91 operation specifically, where there is not a mandated factor for the

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			dispatch computation, there is a provision to use 100% of dry runway braking as documented in note 1 of table 2 provided "the testing from which that braking coefficient was derived was conducted on portions of runways containing operationally representative amounts of rubber contamination and paint stripes."

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	Commenter: Delta Air Lines, Inc. (DAL)		
1.	Both Section 2 on Applicability and Section 5 on Time of Arrival Landing Performance Assessment are quite good. However, DAL recommends that language be included to reiterate the nature of the A/C and avoid interpreting guidance as ad hoc regulations. In the past there have been instances that recommendations in the A/C are regarded as regulation by Certificate Management Offices or FSDO inspectors. Clearly stating in each respective section that the guidance issued offers a means of compliance to Part 91 / 121 /135 AC and that there may be other ways of ensuring safe operational procedures.	DAL recommends that language be included to reiterate the nature of the A/C and avoid interpreting guidance as ad hoc regulations. DAL requests stating in each respective section that the guidance issued offers a means of compliance to Part 91 / 121 /135 AC and that there may be other ways of ensuring safe operational procedures.	We do not concur with this comment and did not revise the AC. The "Applicability" section already clearly states that the guidance provided in the AC is neither mandatory, nor regulatory in nature. It also states that the guidance does not change or create any additional regulatory requirements. This information pertains to the entire document. Therefore, it does not need to be restated throughout the document. DAL's second request goes beyond the scope of the AC. The AC provides a recommended method for calculating the time-of-arrival landing data. How this data is expected to be used will be part of the recommendations in Order 8900.1 and Ops Spec 382 for 121 and 135 operators. As always, part 91 operators will be expected to use good judgment in whatever landing data they choose to use.
2.	5.1 (remove the word assessed… or add coma after arrival)	DAL requests removal of the word assessed… or add coma after arrival.	We concur and removed "assessed."

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3.	5.1 The distance needed to safely complete the landing ~~assessed~~ at the time of arrival may be different if the runway, runway surface condition, meteorological conditions, approach guidance, airplane configuration, airplane weight, approach speed, or use of airplane ground deceleration devices differs from that used to show compliance with § 91.1037, § 121.195, or § 135.385.	DAL requests removal of the word "assessed"	Same comment as #2 above.
4.	Section 5.2 Include the runway slope as a consideration when determining performance.	Include the runway slope as a consideration when determining performance.	We concur with this comment. The list in paragraph 5.2 should include all of the items that are required for consideration of a time-of-arrival computation; this is especially true for items that have not explicitly been required in the § 25.125 computation. Therefore, we added "temperatures, slope, pressure altitude, icing condition." The items are also identified in paragraph 7.2 of the AC.

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5.	Section 6.2 It is good to have a definitive statement on Damp.		We do not concur with this comment and did not revise the AC. The FAA considers the following note as the definitive statement that a damp runway should be considered wet for the purposes of providing performance data: "Note: A damp runway that meets this definition is considered wet, regardless of whether or not the surface appears reflective." How this data is expected to be used should be part of the recommendations in Order 8900.1 and Ops Spec 382 as created by Flight Standards (AFS-200).
6.	Section 6.6 RCC is not mentioned in the Draft AC 150/5200 NOTAM reporting for airports… Is it the intent of the FAA to add RCC to the NOTAM Order? If it is not the intent of the FAA to include RCC in AC 150/5200 then the statement in Section 4.2 – "That data would also be consistent with the terminology used for airport reporting of runway conditions." – will need to be revised.	Consider revising Section 4.2 – "That data would also be consistent with the terminology used for airport reporting of runway conditions."	We concur with this comment and implemented the intent of this comment. We modified paragraph 4.3 and new paragraphs 4.4 and 4.5. The last sentence in paragraph 4.5 states: "The created data would also be consistent with the terminology used for airport reporting of runway conditions."

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	Commenter: Delta Air Lines, Inc. (DAL)		
7.	Section 6.3.7 Is the word frozen necessary? Perhaps just saying "The solid form of water."	Perhaps change to "The solid form of water" or the dictionary definition of Ice: "frozen water"	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The requested change does not improve upon the definition, which was a product of the TALPA ARC and concurred with by the FAA.
8.	Section 7.2.1 There should be additional FAA comment on this topic, i.e. that CAT III landing guidance distances are not always additive to landing distance assessment. Operators should carefully investigate whether or not the air run additives used for operational distances may provide some credit toward CAT III / Autoland landing distance additives.	Request additional comment and clarification	We do not concur with this comment and did not revise the AC. The FAA believes the air run additive DAL is referring to is most likely an additive determined during EASA/JAA certification, which may be provided by manufacturers as an increment to be applied to operational data. The FAA requirements do not contain such an additive. The guidance on landing distance increase for the FAA to address autoland can be found in AC 120-28D, and the method contains factors not increments to be applied at dispatch. We believe the contents of paragraph 8.2.6 are adequate.

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	Commenter: Delta Air Lines, Inc. (DAL)		
9.	Table 2 "Runway Surface Condition–Pilot Reported Braking Action—Wheel Braking Coefficient Correlation Matrix " indicates that 1/8" depth of water or slush provides a Medium to Poor braking action. This correlation is inconsistent with the finding of the TALPA ARC. Furthermore, the implications are such that there will be operations deemed not feasible despite years of safe and reliable service.	Request revisit of the correlation since it is inconsistent with the TALPA ARC.	We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	Commenter: Airport Council International		
1.	The discussion in paragraph 8.4.2, as drafted, introduces ambiguity regarding the source of braking coefficient estimates. My reading of the text is that you intend the calculation should use the braking coefficients contained in Table 2. However, it is possible that, in cases where an airport provides measured CFME or decelerometer data, the paragraph could be interpreted to permit the use of such data. Given the potential for confusion over the source of the braking coefficient data and the fact that FAA's Office of Airports has determined that data from approved CFME/decelerometer devices is not valid for all contaminant types, I suggest the following changes to the text (changes highlighted in yellow): 8.4.2 The calculation of the final stopping configuration distance should be based on the braking coefficient associated with the runway surface condition or pilot-reported braking action in table 2, including the effect of hydroplaning, if applicable. If available, braking coefficient estimates derived from airport operated Continuous Friction Measurement Equipment or decelerometers should only be used for contaminant types for which FAA has approved their use. Credit may be taken for the use of thrust reversers as described in section 10. See section 9 for information about taking into account contaminant drag from loose contaminants.	I realize that FAA intends to revise AC 150/5200-30D, *Airport Field Condition Assessment and Winter Operations Safety* to address this issue. But, given that the revision will not be available for an undetermined period of time, this AC should provide guidance on the subject. Since airports are still allowed to transmit questionable CFME/decelerometer data for unapproved contaminant types, if requested by an air carrier, the guidance in this AC should address the issue.	We do not concur because this comment is beyond the scope of the AC. We passed your comment and suggested change on to FAA Airports (AAS-300) for consideration.

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1.	2.2 states that "this AC in neither mandatory nor regulatory in nature" however AC are and will be regulatory in nature to Airports in the form of AC 150/5200-30D. If that AC comes out with the Depth descriptors that were changed by the FAA in AC-91-79A and in AC 25-X Takeoff and AC-25-X landing, it will force the airports to report an 1/8 inch (which will be the lowest level of depth they can report) of Dry or Wet Snow as a Code 3, and an 1/8 inch of Slush and Water as a Code 2 even though the data from the two years of validation showed those runways to be Good Braking Action And although correct in stating that an AC is not "regulatory in nature", should an airline decide not to adhere to the recommendations set forth and then have some level of incident or accident, the AC is held up as the standard to which one should have been in compliance with. Therefore, it is imperative that the information contained in the AC be correct according to testing and in accordance with the findings of the ARC that was tasked for this specific issue.		We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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2.	The Background section is missing a very important part of the history of the TALPA ARC as it relates to the Landing Analysis. There needs to be an additional paragraph describing the Validation of the Matrix.	4.3 After the TALPA ARC completed its work and delivered its recommendations to the FAA on July 7, 2009, the FAA sponsored two airlines, and 29 airports to validate the slipperiness values of the contaminants on the Matrix, and the feasibility of the airport operations personal to provide an accurate rating of the runway surface condition. This validation testing lasted two winter seasons (2009-2010 and 2010-2011). The first season of testing collected nearly 2000 airport reports and over 2200 pilot braking action reports. After the first season of validation testing, the validation team made modifications to the original TALPA ARC Matrix based on the data collected from the airports and correlated pilot braking action reports. These modifications were then re-validated the second winter season. The data from the second winter season was even more substantial. With close to 21,000 pilot braking action reports, and close to 2100 airport runway condition reports, the contaminant types and depths and their slipperiness values were correlated and validated. This included the airports ability to accurately measure, code, and report the runway surface condition.	We partially concur with this comment. We agree with adding more background information, but added the proposed paragraph with editorial changes: "4.4 After the Committee delivered its recommendations to the FAA, the FAA sponsored two airlines and 29 airports to validate the Runway Condition Codes of the contaminants on the Runway Condition Assessment Matrix (RCAM) and the feasibility of the airport operations personnel to provide an accurate rating of the runway surface condition. (The RCAM is a matrix relating runway condition codes and runway surface conditions.) This validation testing lasted two winter seasons (2009-2010 and 2010-2011). After the first season of validation testing, the validation team made modifications to the original RCAM based on the data collected from the airports and correlated pilot braking action reports. These modifications were re-validated the second winter season. The Committee then used this data as the basis for its final recommended RCAM. 4.5 This AC provides guidance and standardized methods that data providers can use, at their option, to develop landing performance data for time-of-arrival (or

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		4.4 ~~The TALPA ARC completed its actions and delivered its recommendations to the FAA on July 7, 2009.~~ Although the TALPA ARC recommended adopting regulations requiring TC holders to produce landing performance data for time-of-arrival landing performance assessments, the FAA does not currently plan to initiate rulemaking on this issue. However, this AC provides guidance and standardized methods that data providers can use, at their option, to develop landing performance data for time of arrival (or en route) landing performance assessments. Data created following the recommendations of this AC would address the Committee recommendations. That data would also be consistent with the terminology used for airport reporting of runway conditions.	en route) landing performance assessments. Data created following the recommendations of this AC would address the majority of the Committee recommendations. The created data would also be consistent with the terminology used for airport reporting of runway conditions."
3.	This Draft AC is not available for review or comment at this time, therefore should not be included.	Section 3.2 ~~AC 150/5200-30D, *Airport Field Condition Assessment and Winter Operations Safety,* dated TBD~~	We concur with this comment. We revised the document as requested.

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4.	Unless changes to this draft are made; information within this draft is NOT consistent with the recommendations of the final "accepted" RCAM matrix and the reporting of contaminate depths as they relate to the respective categories within the matrix. …this AC provides guidance and standardized methods that data providers can use, at their option, to develop landing performance data for time-of-arrival (or en route) landing performance assessments. Data created following the recommendations of this AC would address the Committee recommendations. That data would also be **consistent with the terminology used for airport reporting of runway conditions.**	Section 4.3 …Data created following the recommendations of this AC ~~would~~ may address ~~the~~ certain Committee recommendations. That data would also be *consistent with the terminology used for airport reporting of runway conditions*.	We concur with the intent of the comment and modified the sentence as follows: "Data created following the recommendations of this AC would address the majority of the Committee recommendations for data providers…." Please note that we moved this sentence to new paragraph 4.5 in the AC.

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5.	While we agree with the goal stated; recent AC's and Orders do not contain consistent terminology used for airport reporting" Such as contained within JO 7930.2P and DRAFT AC 150/5200/28E. As they both have inconsistent reporting depth guidance in their tables and within the examples within those documents (table 5-1-3, and 3-2 respectively). For example table 5-1-3 guidance states for airport operators to report depths as 1/8", ¼", ½", etc. However, the examples given within the documents contain statements like "...visible moisture but less than 1/8 of water." So will airports be required to report both depths less than 1/8" and a depth of 1/8"? AC 91-79A also includes values that are NOT consistent with the final TALPA ARC Matrix as found in the final Validation Report June 2012 and conflict with the other aforementioned guidance.	Section 5.6 …use the same terms and the same definitions for those terms. The FAA is issuing guidance information, including this AC, promoting use of common runway surface condition nomenclature…	We do not concur with this comment and did not revise the AC. The TALPA ARC project includes implementation of multiple products by different parts of the FAA that are on schedules specific to the product. We passed your comment and suggested change on to the appropriate FAA organization for consideration as they continue working on their AC, Order, and Ops Spec or other product. The Takeoff and Landing Performance ACs are leading the project to provide manufacturers and data providers time to create performance data consistent with the airport/NOTAM reporting methods and the Ops Spec revision. The FAA is taking every precaution to ensure all the TALPA products are consistent across disciplines when the final product for the given discipline is published. There is a possibility that the Takeoff and Landing Performance ACs might need to be revised if changes occur after the initial publication.

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6.	Based on the TALPA ARC Recommendations, a runway should be reported WET if there is no visible standing water, and should be reported contaminated if the runway has standing water. Final Matrix from Validation testing June 2012 states: **Wet (Includes Damp and up to and including 1/8" or less depth of Water)** The Note below the Wet runway definition should probably be clarified with the added text in red.	Section 6.2 Wet Runway Note: A damp runway that meets this definition is considered wet, regardless of whether or not the surface appears reflective. A reflective runway should be reported as standing water, as opposed to "Wet".	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The requested change does not improve upon the definition, which was a product of the TALPA ARC and concurred with by the FAA. The requested change would be a significant change in the TALPA ARC recommended definitions with a potentially significant impact on airline operations.
7.	Need to add the statement to specify that the runway is assessed by thirds.	Section 6.3 … a runway is considered contaminated when more than 25 percent of the runway surface area (within the reported length and the width being used), for each third of the runway, is covered by any depth…	We do not concur with this comment and did not revise the AC. The phrase for each third of the runway would materially change the definition of a contaminated runway. The 25 percent threshold for declaring a runway as contaminated for airplane performances is applied to the entire runway not each third.

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8.	Inconsistent reporting depth guidance as stated previously in AC 91-79A and JO 7930.2P references above. Reference the final MATRIX in TALPA Validation Report June 2012 states: Wet (Includes Damp and up to and including 1/8" or less depth of Water). Water greater than 1/8" is considered a RCC of 2 or braking action correlation of MEDIUM-POOR condition.	Section 6.3.6 Water in a liquid state. For purposes of condition reporting and airplane performance, standing water is greater than 1/8" (3mm).	We partially concur with this comment. We revised the AC as follows: "Water in a liquid state. For purposes of condition reporting and airplane performance, water is greater than ⅛ inch (3 mm) in depth."
9.	The intent of the TALPA ARC Matrix was to show how the depth of loose contaminant did affect the slipperiness of the runway. Unfortunately, the change that was made in AC 91-79A and in this AC 25-X, make it so that any depth reported will put the runway into the more slippery category. (Remember "Thin" is going away.) We are not sure why acceleration is important in the landing AC. We would suggest rewording the last sentence of 6.4 as follows it appears in red (assuming that the FAA fixes the depth criteria back to the TALPA ARC Validated values.)	6.4 Loose Contaminants. Loose contaminants are those contaminants that an airplane's tire will not remain on the surface of without breaking through. Water, slush, wet snow, and dry snow are loose contaminants. For loose contaminants, the depth of the contaminant can affect wheel braking coefficient that should be used. For loose contaminants with a depth of 1/8 inch or less, the associated Braking Action would be Good. For loose contaminants with depths greater than 1/8 inch, the value of the wheel braking coefficient is dependent on the water content of that contaminant. Dry and Wet Snow become a 0.16, while Slush and Water become a much worse because of the risk of hydroplaning. (See Table 2)	We do not concur with this comment and did not revise the AC. The purpose of the definition is to define the term, not determine how to apply the term. Also, this AC addresses the parameters for computing the required data, not the application of the data, which will be addressed by Flight Standards (AFS-200).

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10.	In sections 6.5, 7.1.2 and the note on Table 2, Pilot Reported Braking Action, There is a numbered note "1" and "2" and "2" respectfully. This note does not make any sense as written, because when this AC is published, the official change has been published. Medium is already the standard for international carriers, so why not help the transition on a little sooner. Can it be rewritten as in red? This same change should be included in AC 91-79B.	The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. During this transition, either term may be used or heard. MEDIUM and FAIR are synonymous.	We partially concur with this comment. In response to Boeing comments #7, 11, and 16, we changed the note to read: "The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. Until an official change is published, the term "FAIR" may be used."
11.	Same comment as above, but different wording in 6.7: The intent of the TALPA ARC Matrix was to show how the depth of loose contaminant did effect the slipperiness of the runway. Unfortunately, the change that was made in AC 91-79A and in this AC 25-X, make it so that any depth reported will put the runway into the more slippery category. (Remember "Thin" is going away.) I am not sure why acceleration is important in the landing AC. We would suggest rewording the last sentence of 6.7 as follows it appears in red (assuming that the FAA fixes the depth criteria back to the TALPA ARC Validated	6.7 Runway Surface Condition The runway surface condition is a description of the contaminants (if any) on the surface of a runway. Landing performance data based on runway surface condition may include the effects of contaminant depth, temperature, layering (a loose contaminant over a solid contaminant) and runway friction devises (for downgrade of contaminates in Runway Condition Code 5-2, and upgrades for contaminates in Runway Condition Code 1-0).	We do not concur with this comment. However, we revised the definition of Runway Surface Condition so one definition can be used in both the Takeoff and Landing Performance ACs. See Bombardier comment #5 on page 5.

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	values.)		
12.	How layers of contaminates are to be addressed must be included. At a minimum, those recommendations as stated in the TALPA Validation Report June 2012. Example: Dry Snow over Compact Snow and Ice, Slush on top of Compact Snow and Ice, Dry Snow over Frost). While every possible combination is not feasible, there must be some basic guidance with examples on how multiple layers are addressed should be contained within this AC as well as AC91-79A, JO 7030.2P, AC 150/5200-2E, etc. Would the following guidance help the airports and pilots to determine when these freaks of Mother Nature would fall on the RCAM?	Section 6.8 Solid Contaminates NOTE: If contaminant types or combination of contaminants are encountered that are not listed in the RCAM, the following process should be used to determine the most appropriate runway condition code or Braking action: 1. Determine if the unlisted combination of contaminants are listed individually. Example: 1/8" Dry Snow over Frost 2. Identify the most controlling contaminant. Example: Frost by itself is a Code 5 Good, but Dry Snow is either a Code 5 Good if the depth is 1/8 inch or less, or a Code 3 Medium if the depth is greater than 1/8 inch. 3. Determine if the combined effect of the two contaminants would make the runway more slippery (downgrade) than the most controlling contaminant alone. Example: 1/8 inch Slush over Ice - Controlling Contaminant would be Ice at a Code 1 Poor, but the presents of Slush over Ice would cause the runway to be more slippery (NIL) unless Mu values of 40 or greater and other indications allow for the Code 3 Medium	We do not concur with this comment and did not revise the AC. Same justification as comment #6 on page 62. The purpose of the definition is to define the term, not determine how to apply the term. Also, this AC is about the parameters for computing the required data, not the application of the data. The TALPA ARC includes implementation of multiple products by different parts of the FAA that are on schedules specific to the product. We passed your comment and suggested change on to the appropriate FAA organization for consideration as they continue working on their AC, Order, and Ops Spec or other product. The Takeoff and Landing Performance ACs are leading the project to provide manufacturers and data providers time to create performance data consistent with the airport/NOTAM reporting methods and the Ops Spec revision.

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		upgrade. 4. Report the controlling contaminant as the primary until the FAA can add the surprises that Mother Nature can throw at a runway to the RCAM.	
13.	Not sure why Specific Gravity is pertinent to landing data, since no credit is allowed to be taken for contaminant drag. See 9.2. We would recommend deleting it from this AC.	~~6.10 Specific Gravity.~~ ~~The specific gravity of a contaminant is the density of the contaminant divided by the density of water.~~	We do not concur with this comment and did not revise the AC. Paragraph 9.2 states: "…Therefore, the FAA recommends not including the effect of contaminant drag in the calculation of landing distances for time-of-arrival landing performance assessments. If the effect of contaminant drag is included, it should be limited to no more than the drag resulting from 50 percent of the reported depth." The FAA recommendation is to not include the contaminant drag; however, the data provider may still choose to provide data that includes the effect of contaminant drag. If they do, it will be based on a specific gravity. Due to another Airbus comment #10 on page 31, we revised paragraphs 9.3 and 9.4 to include the specific gravities to use if a data provider chooses to provide the information.

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14.	Need to add the terms PATCHY and THIN in the definitions section of this AC. THIN needs to be addressed - with regard to less than or equal to 1/8 inch in defining the level of contaminations in the Matrix and how it is used to define THIN in JO 7930.2N. **The TALPA ARC recommendation was to do away with the term THIN**. However, if the term remains, it would fall within the GOOD category of 1/8 inch or less in the ARC RCAM. This creates a significant issue for many early adopter airlines as they have already implemented company SOPs and training programs that use the recommendations within the final ARC RCAM. We request that the new slightly revised Matrix and the definition in JO 7930.2N for THIN be revised to match the final TALPA ARC recommendation (i.e., 1/8 inch or less). PATCHY appears to have been harmonized within other guidance documents but it is NOT mentioned within this draft section and should be defined.	New Section 6.11 THIN – 1/8" or less of… PATCY - a contaminant that covers 25 percent or less of the usable portion of the surface for each third of the runway.	We do not concur because this comment is beyond the scope of the AC. We passed your comment and suggested change on to the FAA Airports (AAS-300) for consideration as they continue working on their ACs and the NOTAM Order.

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15.	By the way, there are contaminants on the current list in 7930.2P CHG 1 that do not appear on the RCAM. Ash, Rubber, and Oil were never discussed in relation to their slipperiness. Rubber and Oil may fall into the Slippery when Wet category and Ash would probably never be landed on for fear of FOD. Sand was intended as a treatment, not as a contaminant. Also there are contaminants we missed when we developed the TALPA ARC Matrix that we never considered.	The list of reportable contaminants in Table 1 does not match the list in FAA Order 7930.2P CHG 1.	We do not concur with this comment and did not revise the AC. It is premature to comment on the consistency across products, since the TALPA ARC includes implementation of multiple products by different parts of the FAA that are on schedules specific to the product.
16.	While AC 150/5200-28E does provide guidance on NOTAM issuance when outside of hours of operations: *…Airport operators should use "conditions-not-monitored" NOTAMs as a way to provide information to pilots related to the conditions not being monitored at the airport, perhaps due to operations hours or staffing…* However this doesn't provide the operators any guidance on how to comply or who is responsible for providing the required information to the arriving aircraft. This is	Add information regarding Non-Tower Operations reporting Little thought or guidance in any FAA AC or Order regarding this issue. Who is responsible? What training will be required? Will certifications necessary?	We do not concur because this comment is beyond the scope of the AC. We passed your comment and suggested change on to the FAA Airports (AAS-300) and Flight Standards (AFS-200) for consideration.

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	potentially a large safety risk that was overlooked in the TALPA ARC and current ACs. There is very little thought or guidance in any FAA AC or Order regarding Non-Tower Operations (tower closed for Ops during time of arrival). While this is an operational issue and does not belong within this AC, it is an area that was not well addressed within the TALPA ARC recommendations or any other current FAA guidance material. This is potential safety risk, especially for cargo carriers that operate outside of normal hours at many airports around the country. The same would apply to part 91 operators to smaller airports around the country.		
17.	Reporting "Thin" contaminants **SHOULD** go away with AC 150/5200-30D, 150/5200-28E, AC91-79A, and FAA Order JO 7930.2P and within this AC. They should reflect the TALPA ARC Recommended reporting criteria. Keep in mind section 9.1.1. We would suggest adding the additional clarification to 9.1.1. The RCAM in Table 2 of this draft uses values of "Less than ⅛″ (3 mm) depth" which is not included in section 9.1.1 for	9.1.1 Contaminant depths are reported in field condition reports using specific depth increments: ⅛ inch, ¼ inch, ½ inch, 1 inch, etc. Depths up to and including ⅛ inch would be reported as ⅛ inch, between ⅛ inch and ¼ inch are reported as ¼ inch; depths between ¼ inch and ½ inch are reported as ½ inch; and so on.	We do not concur because this comment is beyond the scope of the AC. We passed your comment and suggested change on to the FAA Airports (AAS-300) and Flight Standards (AFS-200) for consideration.

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	reporting field condition depth increments. **The TALPA ARC recommendation was to do away with the term THIN**. However, if the term remains, it would fall within the GOOD category of 1/8 inch or less in the final ARC RCAM.		
18.	The TALPA ARC did not promote the use of wind values to be used to be like that used for Dispatch Landing (25.125(e))	Revise 7.2.7 to only use the actual wind component, not a factored wind component.	We do not concur with this comment and did not revise the AC. The TALPA ARC part 25 submittal did call out specifically the use of factored winds for the time-of-arrival calculations.
19.	No mention of recommended safety factor as per SAFO 0612 and the TALPA ARC recommendations. Add a section that contains the following statement from SAFO 0612.	New Section 8.1.4 The FAA considers a 15% margin between the expected actual airplane landing distance and the landing distance available at the time of arrival as the minimum acceptable safety margin for normal operations. This SAFO urgently recommends that operators of turbojet airplanes develop procedures for flightcrews to assess landing performance based on conditions actually existing at time of arrival, as distinct from conditions presumed at time of dispatch. Those conditions include weather, runway conditions, the airplane's weight, and braking systems to be used. Once the actual landing distance is determined an additional safety margin of at least 15% should be	We do not concur because this comment is beyond the scope of the AC. The recommended safety factor for time-of-arrival landing distances will be in Order 8900.1 and Ops Spec 382.

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		added to that distance.	
20.	Address Operators that wish to use landing distances based on a value less than 7 seconds air distance or touchdown less than 1,500' from the threshold.	New Section 8.3.7 or in 8.2 A statement about operators who choose to provide landing data that incorporates a touchdown of less than the guidance provided in the previous section, should do so by either Ops Spec approval with their FAA CMO.	We do not concur because this comment is beyond the scope of the AC. We passed your comment on to Flight Standards (AFS-200) for consideration in Order 8900.1 and Ops Spec 382.
21.	New Section 8.3.8 Autobrakes and the requirement of landing data	Auto-brake data for landing on a treated DRY or WET surface: The estimated landing distance with Auto-brake use when landing on a TREATED (grooved, PFO) runway, should not be required to include the 15% safety factor for DRY and WET conditions as long as the Max Manual braking data DOES include the 15% safety factor.	We do not concur with this comment and did not revise the AC. Same justification as FedEx comment #20 above.
22.	Table 2 is the sources of the problems in this AC. Redefining the Depth from "1/8 inch or less" to "Less than 1/8 inch" is an extremely significant change that needs to be corrected. Here are the reasons that this must be changed: Depths of "Less than 1/8 inch" will simply not be reported. As a result of the FAA's change to the RCAM in AC91-79A and AC 25-X, this would force the airports to Code	**Runway Surface Condition Description** • Frost • Wet (includes damp and water less than 1/8″ deep) 1/8″ (3 mm) or less depth of: • Water • Slush • Dry snow • Wet snow -15 °C and colder outside air temperature: • Compacted snow	We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	the runway as a 2/2/2 for ***any*** reported depth of slush or standing water, and a 3/3/3 for ***any*** reported depth of Dry or Wet Snow, when full implementation occurs. The validation that Alaska Airlines, Pinnacle Airlines, 29 airports and the FAA did over two winter seasons validated that the reporting of an 1/8 inch contaminant resulted in a Good Pilot Braking action Report 1045 times vs only 25 times that condition was rated either Medium or Medium to Poor. The airports were trained not to use the term "Thin" in the data collection, and report depths in accordance with the TALPA ARC Depth criteria. Early adopter airlines include: Alaska, Pinnacle, United, Delta, American/US Airways, UPS, FedEx, Southwest, West Jet, and JetBlue. This would include extensive programmatic changes to our ACARS System, and our Dispatch and pilot performance software, extensive re-training of our pilots that would actually turn into negative training since our pilots already know that 1/8 inch of contaminant is going to be Good Braking Action The 1/8" or greater change significantly affects the coding: Going from a 5 to a 3, or	• Wet ("slippery when wet" runway) • Dry snow or wet snow (any depth) over compacted snow Greater than 1/8″ (3 mm) depth of: • Dry snow • Wet snow Warmer than -15 °C outside air temperature: • Compacted snow Greater than 1/8″ (3 mm) depth of: • Water • Slush • Ice • Wet ice • Water on top of compacted snow • Dry snow or wet snow over ice	

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	a 2 with Slush or Water. This has detrimental effects on operational reliability which would prohibit landing Operations with 1/8" water or Slush for the MD11. **The MD11 aircraft would practically be prohibited from operations in WET or Contaminated conditions with 1/8" of water or slush (RCC 2). This is NOT acceptable.** Code 3: MD11: any Rwy less than 11,000' prohibited. Code 2 ops prohibited: 777: Rwys less than 8,300' 767: Rwys less than 7,000' Airbus: Rwys less than 6,900' It should also be noted that this is a change from final TALPA ARC RCAM proposals and that it conflicts with the only pre-existing practice under EASA regulation which clearly defines contaminated as MORE THAN 3mm depth. We also insist on the fact that the final decision should be harmonized within the FAA as well as ICAO (and EASA).		

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23.	Sections 11.2.2, 11.3.1, and 11.4 all use the term "you". Who is "you"? Is that the airplane manufacturer? The operator? The Flight Crew?	11.2.2 …If you have landing performance… 11.3.1 You should develop… 11.4 …However, you should…	We concur with this comment. We replaced "you" with "data provider" in the AC.
24.	New Section Advisory material will call out that AFM coverage is for normal configuration (including MEL/CDL) but does not include non-normal configurations of enroute failures. The basic philosophy is the data should be available for all parameters that affect an airplane's landing distance from threshold to full stop.	The AFM advisory material should specifically call out that the AFM data will cover the normal landing operation (including MEL/CDL items) and not the emergency cases such as engine failure or flaps up landing which result in non-normal configuration and procedures. It is also recommended that the advisory material recommend the manufacturer supply data to cover non-normal configuration cases in the operating information. The basic philosophy is the data should be available for all parameters that affect an airplane's landing distance from threshold to full stop.	We concur with this comment. We revised the document to include the following paragraph: "7.3 Data providers should provide appropriate information for minimum equipment list and configuration deviation list items that affect landing distance."

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25.	TABLE 2 RCAM (slightly modified TALPA ARC version) Detrimental effects on operational reliability due to the changes in the RCAM in this AC and AC91-79A.	Replace the RCAM in Table 2 with the RCAM specified in the TALPA ARC final recommendations.	We do not concur with this comment and did not revise the AC. Following the submission of the final TALPA ARC recommendations, there was a two-winter study where the RCAM was validated by use by two airlines at multiple airports. This validation process caused the RCAM to be modified. The RCAM is being restored to the version of the RCAM that was a result of this activity. The final Takeoff and Landing Performance ACs will reflect this change.
26.	It is critical for the FAA to understand that the work the TALPA ARC was done as a team. Even though there were many different working groups that addressed their specific parts of the regulations, all groups worked very hard to ensure the individual working groups recommendations were in concert with all of the other working groups within the ARC. The following comments pertain to the entire AC 25-X Takeoff and Landing, as well as AC 91-79A and the other ACs that will follow as the FAA implements the TALPA ARC recommendations. The FAA, Alaska Airlines, and Pinnacle Airlines spent a great deal of time, energy and money to train 29 airports (11 in Alaska,		We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm). The FAA plans to revise AC 91-79A to reflect this change, that is, the depth at which the runway will be considered contaminated to greater than 1/8″ as in the original TALPA submittal. The last part of this comment discusses publication of the RCAM matrix in horizontal and vertical styles. This AC does not address usage of the RCAM for airport

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	and 18 in the lower 48) to report and validate the contaminant types and depth relationships on the MATRIX between 2009-2011. Alaska Airlines and Pinnacle Airlines also trained every pilot to use the MATRIX, and to make accurate Braking Action Reports. This data is available at the FAA Technical Center (see Takeoff and Landing Performance Assessment Validation Effort of the Runway Condition Assessment Matrix by Nicholas Subbotin and Susan Gardner, June 2013. DOT/FAA/TC-TN13/22). At no time during training or testing was the "Less than 1/8 inch" criteria used or even discussed. As a result of that validation testing, the Validation Team from the FAA distributed the results to the rest of the TALPA ARC in the form of the Final Matrix Vertical and Horizontal (also attached). At some point after that, we were informed by the FAA that the TALPA ARC recommendations would not go through the actual rule making process, but the FAA would implement the TALPA ARC Recommendations, to include the Final Matrix Vertical and Horizontal versions, by Advisory Circular – **without change**. AC 150/5200-28E, JO 7930.2P CHG 1, AC 91-		operations or flight operations. As a result, this comment on the publication of horizontal and vertical matrix is beyond the scope of this AC. We passed on your comment to the appropriate organizations for their consideration.

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	79A, and now AC 25-X Takeoff and AC 25-X Landing all have gone against the recommendations of the TALPA ARC without explanation. This definition change for the depth of contaminants on the RCAM in AC 91-79A and AC 25-x is more than significant. It undermines the cornerstone of the work the TALPA ARC did and the two year training and validation project after the TALPA ARC had completed its work. It also puts into question the safe operations of Alaska Airlines, Pinnacle Airlines, Delta, American Airlines, United Airlines, FedEx (new Performance software developed and training being implemented now), Southwest Airlines, and all of the other airlines that have chosen to voluntarily operate under the rules and guidelines that were recommended by the TALPA ARC, and have been using the Final Matrix Vertical or Horizontal. Many of these airlines have put considerable expense into developing aircraft performance tools that match the Final Matrix from the 2011 validation meeting. The RCAM in AC 91-79A and AC 25-X Takeoff and Landing must be revised back to the values that were included in the original TALPA ARC Matrix, and are		

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	repeated in the Final Matrix Vertical and Horizontal values as agreed upon by the TALPA ARC validation team in the spring of 2011.		

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1.	The Background section is missing a very important part of the history of the TALPA ARC as it relates to the Landing Analysis. There needs to be an additional paragraph describing the Validation of the Matrix.	4.3 After the TALPA ARC completed its work and delivered its recommendations to the FAA on July 7, 2009, the FAA sponsored two airlines, and 29 airports to validate the slipperiness values of the contaminants on the Matrix, and the feasibility of the airport operations personal to provide an accurate rating of the runway surface condition. This validation testing lasted two winter seasons (2009-2010 and 2010-2011). The first season of testing collected nearly 2000 airport reports and over 2200 pilot braking action reports. After the first season of validation testing, the validation team made modifications to the original TALPA ARC Matrix based on the data collected from the airports and correlated pilot braking action reports. These modifications were then re-validated the second winter season. The data from the second winter season was even more substantial. With close to 21,000 pilot braking action reports, and close to 2100 airport runway condition reports, the contaminant types and depths and their slipperiness values were correlated and validated. This included the airports ability to accurately measure, code, and report the runway surface condition. 4.4 ~~The TALPA ARC completed its actions~~	Same comment as FedEx comment #2 on page 58. We partially concur with this comment. We agree with adding more background information, but added the proposed paragraph with editorial changes: "4.4 After the Committee delivered its recommendations to the FAA, the FAA sponsored two airlines and 29 airports to validate the Runway Condition Codes of the contaminants on the Runway Condition Assessment Matrix (RCAM) and the feasibility of the airport operations personnel to provide an accurate rating of the runway surface condition. (The RCAM is a matrix relating runway condition codes and runway surface conditions.) This validation testing lasted two winter seasons (2009-2010 and 2010-2011). After the first season of validation testing, the validation team made modifications to the original RCAM based on the data collected from the airports and correlated pilot braking action reports. These modifications were re-validated the second winter season. The Committee then used this data as the basis for its final recommended RCAM. 4.5 This AC provides guidance and standardized methods that data providers can use, at their option, to develop landing

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		~~and delivered its recommendations to the FAA on July 7, 2009.~~ Although the TALPA ARC recommended adopting regulations requiring TC holders to produce landing performance data for time-of-arrival landing performance assessments, the FAA does not currently plan to initiate rulemaking on this issue. However, this AC provides guidance and standardized methods that data providers can use, at their option, to develop landing performance data for time of arrival (or en route) landing performance assessments. Data created following the recommendations of this AC would address the Committee recommendations. That data would also be consistent with the terminology used for airport reporting of runway conditions.	performance data for time-of-arrival (or en route) landing performance assessments. Data created following the recommendations of this AC would address the majority of the Committee recommendations. The created data would also be consistent with the terminology used for airport reporting of runway conditions."
2.	2.2 states that "this AC in neither mandatory nor regulatory in nature" however AC are and will be regulatory in nature to Airports in the form of AC 150/5200-30D. If that AC comes out with the Depth descriptors that were changed by the FAA in AC-91-79A and in AC 25-X Takeoff and AC-25-X landing, it will force the airports to report an 1/8 inch (which will be the lowest level of depth they can report) of Dry or Wet Snow as a Code 3, and an 1/8 inch of Slush and Water as a Code 2 even though the data from		We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	the two years of validation showed those runways to be Good Braking Action		
3.	Based on the TALPA ARC Recommendations, a runway should be reported WET if there is no visible standing water, and should be reported contaminated if the runway has standing water. This is the only place that the "less than 1/8 inch (3 mm) in depth" works. The Note below the Wet runway definition should probably be clarified with the added text in red.	6.2 Wet Runway. A runway is wet when it is neither dry nor contaminated. For purposes of condition reporting and airplane performance, a runway can be considered wet when more than 25 percent of the runway surface area (within the reported length and the width being used) is covered by any visible dampness or water that is less than ⅛ inch (3 mm) in depth. Note: A damp runway that meets this definition is considered wet, regardless of whether or not the surface appears reflective. A reflective runway should be reported as 1/8 inch of standing water, as opposed to "Wet".	We do not concur with this comment and did not revise the AC. The TALPA ARC recommended definitions were finalized and modified as determined by a cross-function team of FAA representatives from Flight Standards (AFS-200), Transport Airplane Directorate (ANM-100), and Airports (AAS-300). Therefore, we did not implement the requested change since the current definition meets the needs of the majority of the interested parties. The requested change does not improve upon the definition, which was a product of the TALPA ARC and concurred with by the FAA. The requested change would be a significant change in the TALPA ARC recommended definitions with a potentially significant impact on airline operations.

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<tr><th>No.</th><th>Comment</th><th>Requested Change</th><th>Disposition</th></tr>
<tr><td></td><td colspan="3">Commenter: Alaska Airlines</td></tr>
<tr><td>4.</td><td>Again, Water is the one area where if it is less than 1/8 inch, all the way to just damp, then the runway would be reported as Wet vs “Water”. If the runway is reflective, it is a good indication that it is more than just Wet. That information may not belong in AC 25-X Landing, but it might belong in the Airport and 121 AC.

I believe the following guidance would also be appropriate.

This all assumes that the FAA is going to “Fix” the depth criteria in the RCAM back to what was tested and validated during the 2009-2011 validation.

NOTE: This rainfall intensity depth criteria has been used by Alaska Airlines since July 2014. There are many variables that effect the water drainage that are unique to every runway. The intent of this guidance is to provide an awareness to the flight crew regarding the potential for standing water on the runway. In Alaska Airlines operations, the difference between WET Data, and Degraded Braking action date is significant. Wet data is unfactored with all auto-brake setting provided, while “Code 5/Good” data is factored with the 15% safety margin, is based only on the auto-brake setting the pilot</td><td>6.3.6 Water.

Water in a liquid state. For purposes of condition reporting and airplane performance, water is ⅛ inch (3 mm) or greater in depth. In conditions of steady rain, the depth of water on a runway may be a function of the rainfall intensity. In the absence of a current FICON Report/PIREP or the ability to visually assess the runway condition (takeoff), assume water depths as follows:

<table><tr><td>Light Rain</td><td>-RN</td><td>Runway is Wet</td></tr><tr><td>Moderate Rain – Grooved Runway</td><td>RN</td><td>Water depth is 1/8 inch or less</td></tr><tr><td>Moderate Rain – Un-grooved Runway</td><td>RN</td><td>Water depths of more than 1/8 inch</td></tr><tr><td>Heavy Rain</td><td>+RN</td><td>Water depths of more than 1/8 inch</td></tr></table></td><td>This comment is beyond the scope of the TALPA ARC recommendations and this AC; therefore, we did not revise the AC.

The FAA recognizes that over the last five years there have been instances where reduced wheel braking was experienced during moderate to heavy rain. This was addressed by Flight Standards in SAFO 05012. However, there is not universal acceptance on the physics or the runway characteristics, which may cause the reduced braking that has been observed.

The effect of rain intensity will be included in the upcoming Flight Test Harmonization Working Group activity that will look into wet runway issues. This comment will be included for consideration in that activity.</td></tr>
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	requested, and provides factored landing data for all braking action levels 5-1. That way if the rainfall becomes heavy, they would brief and know that they could still land (or need to go around) with a Code 2 Medium to Poor		
5.	The intent of the TALPA ARC Matrix was to show how the depth of loose contaminant did effect the slipperiness of the runway. Unfortunately, the change that was made in AC 91-79A and in this AC 25-X, make it so that any depth reported will put the runway into the more slippery category. (Remember "Thin" is going away.) I am not sure why acceleration is important in the landing AC. I would suggest rewording the last sentence of 6.4 as follows it appears in red (assuming that the FAA fixes the depth criteria back to the TALPA ARC Validated values.)	6.4 Loose Contaminants. Loose contaminants are those contaminants that an airplane's tire will not remain on the surface of without breaking through. Water, slush, wet snow, and dry snow are loose contaminants. For loose contaminants, the depth of the contaminant can affect wheel braking coefficient that should be used. For loose contaminants with a depth of 1/8 inch or less, the associated Braking Action would be Good. For loose contaminants with depths greater than 1/8 inch, the value of the wheel braking coefficient is dependent on the water content of that contaminant. Dry and Wet Snow become a 0.16, while Slush and Water become a much worse because of the risk of hydroplaning. (See Table 2)	We do not concur with this comment and did not revise the AC. The purpose of the definition is to define the term, not determine how to apply the term. Also, this AC addresses the parameters for computing the required data, not the application of the data, which will be addressed by Flight Standards (AFS-200).

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6.	In sections 6.5, 7.1.2 and the note on Table 2, Pilot Reported Braking Action, There is a numbered note "1" and "2" and "2" respectfully. This note does not make any sense as written, because when this AC is published, the official change has been published. Medium is already the standard for international carriers, so why not help the transition on a little sooner. Can it be rewritten as in red? This same change should be included in AC 91-79B	The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. During this transition, either term may be used or heard. MEDIUM and FAIR are synonymous.	We partially concur with this comment. In response to Boeing comments #7, 11, and 16, we changed that note to read: "The braking action term "FAIR" is in the process of being changed to "MEDIUM" throughout the FAA. Until an official change is published, the term "FAIR" may be used."
7.	Same comment as above, but different wording in 6.7: The intent of the TALPA ARC Matrix was to show how the depth of loose contaminant did effect the slipperiness of the runway. Unfortunately, the change that was made in AC 91-79A and in this AC 25-X, make it so that any depth reported will put the runway into the more slippery category. (Remember "Thin" is going away.) I am not sure why acceleration is important in the landing AC. I would suggest rewording the last sentence of 6.7 as follows it appears in red (assuming that the FAA fixes the depth criteria back to the TALPA ARC Validated values.)	6.7 Runway Surface Condition. The runway surface condition is a description of the contaminants (if any) on the surface of a runway. Landing performance data based on runway surface condition may include the effects of contaminant depth, temperature, layering (a loose contaminant over a solid contaminant) and runway friction devises (for downgrade of contaminates in Runway Condition Code 5-2, and upgrades for contaminates in Runway Condition Code 1-0).	We do not concur with this comment. However, we revised the definition of Runway Surface Condition so one definition can be used in both the Takeoff and Landing Performance ACs. See Bombardier comment #5 on page 5.

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8.	Not sure why Specific Gravity is pertinent to landing data, since no credit is allowed to be taken for contaminant drag. See 9.2. I would recommend deleting it from this AC.	~~6.10 Specific Gravity.~~ ~~The specific gravity of a contaminant is the density of the contaminant divided by the density of water.~~	We do not concur with this comment and did not revise the AC. Paragraph 9.2 states: "…Therefore, the FAA recommends not including the effect of contaminant drag in the calculation of landing distances for time-of-arrival landing performance assessments. If the effect of contaminant drag is included, it should be limited to no more than the drag resulting from 50 percent of the reported depth." The FAA recommendation is to not include the contaminant drag; however, the data provider may still choose to provide data that includes the effect of contaminant drag. If they do it will be based on a specific gravity. Due to Airbus comment #10 on page 31, we revised paragraphs 9.3 and 9.4 to include the specific gravities to use if a data provider chooses to provide the information.

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9.	The list of reportable contaminants in Table 1 does not match the list in FAA Order 7930.2P CHG 1. By the way, there are contaminants on the current list in 7930.2P CHG 1 that do not appear on the RCAM. Ash, Rubber, and Oil were never discussed in relation to their slipperiness. Rubber and Oil may fall into the Slippery when Wet category, and Ash would probably never be landed on for fear of FODing the engines. Sand was intended as a treatment, not as a contaminant. Also there are contaminants we missed when we developed the TALPA ARC Matrix that we never considered. These include Dry/Wet Snow over Frost and Slush over Ice. Would the following guidance help the airports and pilots to determine when these freaks of Mother Nature would fall on the RCAM? NOTE: If contaminant types or combination of contaminants are encountered that are not listed in the RCAM, the following process should be used to determine the most appropriate runway condition code or Braking action: 1. Determine if the unlisted combination of	Only the contaminants marked with an "*" are to be accompanied by a depth. When reporting a 1. Only the contaminants marked with an "*" are to be accompanied by a depth. When reporting a runway condition, a depth is mandatory with those contaminants marked by an asterisk, "*", in TBL 1 runway condition, a depth is mandatory with those contaminants marked by an asterisk, "*", in TBL 1. Those contaminants marked with an "*" are considered "Loose Water* (⅛ inch and greater) Frost Slush* Ice Wet ice Water* over ice Wet snow* Wet snow* over ice Dry snow* Dry snow* over ice Compacted snow Water* over compacted snow Wet snow* over compacted snow Dry snow* over compacted snow Ash*	We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to FAA Airports (AAS-300) for consideration.

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	contaminants are listed individually. Example: 1/8" Dry Snow over Frost 2. Identify the most controlling contaminant. Example: Frost by itself is a Code 5 Good, but Dry Snow is either a Code 5 Good if the depth is 1/8 inch or less, or a Code 3 Medium if the depth is greater than 1/8 inch. 3. Determine if the combined effect of the two contaminants would make the runway more slippery (downgrade) than the most controlling contaminant alone. Example: 1/8 inch Slush over Ice - Controlling Contaminant would be Ice at a Code 1 Poor, but the presents of Slush over Ice would cause the runway to be more slippery (NIL) unless Mu values of 40 or greater and other indications allow for the Code 3 Medium upgrade. 4. Report the controlling contaminant as the primary until the FAA can add the surprises that Mother Nature can throw at a runway to the RCAM.	Mud* Rubber Oil Sand	

DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: Alaska Airlines		
10.	Reporting "Thin" contaminants will go away with AC 150/5200-30D and the new FAA Order replacing JO 7930.2P this AC in should reflect the TALPA ARC Recommended reporting criteria. Keep in mind section 9.1.1. I would suggest adding the additional clarification to 9.1.1.	9.1.1 Contaminant depths are reported in field condition reports using specific depth increments: ⅛ inch, ¼ inch, ½ inch, 1 inch, etc. Depths up to and including ⅛ inch would be reported as ⅛ inch, between ⅛ inch and ¼ inch are reported as ¼ inch; depths between ¼ inch and ½ inch are reported as ½ inch; and so on.	We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to FAA Airports (AAS-300) for consideration.
11.	In section 8.2 Air Distance, it needs to be made clear that the manufacture should provide both methods of calculating air distance. It should be left up to the Ops Spec to allow an air carrier to demonstrate the specific training used to certify their pilots to use the 1000 ft air run. Otherwise we will lose critical air service into many of the short fields that are out there.		We do not concur with this comment as it is beyond the scope of this AC. We passed your comment on to Flight Standards (AFS-200) for consideration. The ability of an operator to use a shorter air distance in the calculation of landing distance will be in Order 8900.1 and Ops Spec 382.

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	Commenter: Alaska Airlines		
12.	Table 2 is the sources of the problems in this AC. Redefining the Depth from "1/8 inch or less" to "Less than 1/8 inch" is an extremely significant change that needs to be corrected. Here are the reasons that this must be changed: Depths of "Less than 1/8 inch" will simply not be reported. As a result of the FAA's change to the RCAM in AC91-79A and AC 25-X, this would force the airports to Code the runway as a 2/2/2 for ***any*** reported depth of slush or standing water, and a 3/3/3 for ***any*** reported depth of Dry or Wet Snow, when full implementation occurs. The validation that Alaska Airlines, Pinnacle Airlines, 29 airports and the FAA did over two winter seasons validated that the reporting of an 1/8 inch contaminant resulted in a Good Pilot Braking action Report 1045 times vs only 25 times that condition was rated either Medium or Medium to Poor. The airports were trained not to use the term "Thin" in the data collection, and report depths in accordance with the TALPA ARC Depth criteria. Early adopter airlines include: Alaska, Pinnacle, United, Delta, American/US Airways, UPS, FedEx (recently started	**Runway Surface Condition Description** • Frost • Wet (includes damp and water less than 1/8″ deep) 1/8″ (3 mm) or less depth of: • Water • Slush • Dry snow • Wet snow -15 °C and colder outside air temperature: • Compacted snow • Wet ("slippery when wet" runway) • Dry snow or wet snow (any depth) over compacted snow Greater than 1/8″ (3 mm) depth of: • Dry snow • Wet snow Warmer than -15 °C outside air temperature: • Compacted snow Greater than 1/8″ (3 mm) depth of: • Water • Slush • Ice • Wet ice • Water on top of compacted snow • Dry snow or wet snow over ice	We concur with this comment and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	programming and training based on original Matrix), Southwest, West Jet, and JetBlue. This would include extensive programmatic changes to our ACARS System, and our Dispatch and pilot performance software, extensive re-training of our pilots that would actually turn into negative training since our pilots already know that 1/8 inch of contaminant is going to be Good Braking Action Detrimental effect on operational reliability Takeoff data for 1/8 inch Slush would have to be based on Slippery (Poor) data even though the validation data shows that runway to be 5/5/5 Good. This would prohibit Takeoff Operations in these conditions on runways shorter than: 8500 737-700 9800 737-800SFP 10200 737-800W 11000 737-900W 11400 737-400 Every station in the state of Alaska (except ANC and FAI) would be unavailable for takeoff with this new depth criteria. This would prohibit Landing Operations in these conditions on runways shorter than: 6700 737-700		

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	6800 737-400 7300 737-800SFP 7700 737-900ER and 737-800W 7800 900W NOTE: This data assumes the special training to use the 1000 ft. air run.		
13.	Sections 11.2.2, 11.3.1, and 11.4 all use the term "you". Who is you? Is that the airplane manufacturer? The operator? The Flight Crew?		We replaced "you" with "data provider" in the AC.
14.	The following comments pertain to the entire AC 25-X Takeoff and Landing, as well as AC 91-79A and the other ACs that will follow as the FAA implements the TALPA ARC recomendations. The application of the appropriate performance penalties were also accounted for by the original TALPA ARC work. Here is a summary of those penalties, and how they were intended to be applied: ***Dry runway.*** For airplane performance purposes and use of this Matrix, a runway can be considered dry when no more than 25 percent of the runway surface area within the reported length and the width being used is covered by 1. Visible moisture or dampness, or		We partially concur with this comment. We changed the AC such that runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm). Much of the rest of the comment is out of scope for this AC and has been forwarded to FAA Airports (AAS-300) and Flight Standards (AFS-200) for consideration.

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	Commenter: Alaska Airlines		
	2. Frost, slush, snow (dry or wet), ice, or compacted snow. Then: • For Landing, use DRY Advisory Landing Data. This data does not need to be "factored" with the additional 15% safety margin since it is predicated on advisory autobrake data to a complete stop on the runway with no pilot intervention. Factoring this data could lead a pilot to use significantly more autobrakes than required and could lead to stopping short on the runway and causing go-around of subsequent aircraft as a result. • For Takeoff, use DRY takeoff performance data. ***Wet runway.*** For airplane performance purposes and use of this Matrix, a runway is considered wet when more than 25 percent of the runway surface area within the reported length and the width being used is covered by any visible dampness or any water up to 1/8-inch (3 mm) deep. Then: • For Landing, use WET Advisory		

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	Landing Data based on Code 5/Good BA. This data does not need to be "factored" with the additional 15% safety margin since it is predicated on advisory autobrake data to a complete stop on the runway with no pilot intervention. Factoring this data could lead a pilot to use significantly more autobrakes than required and could lead to stopping short on the runway and causing go-around of subsequent aircraft as a result. • For Takeoff, use WET takeoff performance data. If the runway has **1/8 inch or less** of Wet or Dry Snow, Slush or Water: • For Landing, use Degraded Braking Action Landing Data based on Code 5/Good BA with the additional 15% safety margin. • For Takeoff, use data based on Code 5/Good (equivalent to WET) takeoff performance data. No impingement drag penalty needs to be applied. If the runway is reported as having 1/4 inch (**Greater than 1/8 inch** up to and including 1/4 inch) of Wet Snow, Slush , or Water:		

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	• For Landing, use Degraded Braking Action Landing Data based on Code 3/Medium BA with the additional 15% safety margin for Wet Snow and Code 2 Medium to Poor for Slush and Water (because of the risk of hydroplaning) • For Takeoff, use data based on 1/4 inch loose contaminant takeoff performance data. If the runway is reported as having **DRY SNOW** Greater than 1/8 inch up to and including 1 inch (Dry snow has a lower specific gravity than wet snow, slush or water, so its takeoff penalty is handed differently): • For Landing, use Degraded Braking Action Landing Data based on Code 3/Medium BA with the additional 15% safety margin • For Takeoff, use data based on **1/8 inch** loose contaminant takeoff performance data. **This would be the only time the current 1/8 inch penalty would need to be applied.** If the runway is reported as having 1/2 inch (Greater than 1/4 inch up to and including		

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	1/2 inch) of Wet Snow, Slush , or Water: • For Landing, use Degraded Braking Action Landing Data based on Code 3/Medium BA with the additional 15% safety margin for Wet Snow and Code 2 Medium to Poor for Slush and Water (because of the risk of hydroplaning) • For Takeoff, use data based on 1/2 inch loose contaminant takeoff performance data. If the runway is reported as having **DRY SNOW** Greater than 1 inch up to and including 2 inches (Dry snow has a lower specific gravity than wet snow, slush or water, so its takeoff penalty is handed differently): • For Landing, use Degraded Braking Action Landing Data based on Code 3/Medium BA with the additional 15% safety margin • For Takeoff, use data based on 1/4 inch loose contaminant takeoff performance data. If the runway is reported as having **DRY SNOW** Greater than 2 inches up to and including 4 inches (Dry snow has a lower		

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	Commenter: Alaska Airlines		
	specific gravity than wet snow, slush or water, so its takeoff penalty is handed differently): • For Landing, use Degraded Braking Action Landing Data based on Code 3/Medium BA with the additional 15% safety margin • For Takeoff, use data based on 1/2 inch loose contaminant takeoff performance data. There are no takeoff performance data available for wet contaminant types (wet snow, slush, or water) for depths greater than ½ inch nor DRY SNOW Greater than 4 inches. Takeoff operations in these conditions would be suspended until the runway is cleared. If the contaminant is "Slippery" rather than loose (i.e. Compact Snow, Ice, Frost) then the takeoff and landing penalties are predicated on the Runway Condition Code assigned to that contaminant type and depth from the MATRIX. • For Landing, use Degraded Braking Action Landing Data based on the assigned Runway Condition Code with the additional 15% safety		

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	Commenter: Alaska Airlines		
	margin • For Takeoff, use the manufacturers slippery data for the Runway Condition Code assigned. NOTE: Boeing does not provided slippery takeoff data for the intermediate values, so it would be necessary to use Code 3/Medium for Compact Snow OAT -15 or colder (normally a Code 4/Good to Medium). I hope this helps the larger group to see that there it was always the intent of the TALPA ARC to treat a runway with contaminant depths of **1/8 inch or less** as a contaminated runway. It seems to be a misunderstanding on this point that may have driven the FAA to make this change. It is critical for the FAA to understand that the work the TALPA ARC was done as a team. Even though there were many different working groups that addressed their specific parts of the regulations, we worked very hard to ensure our individual working groups recommendations were in concert with all of the other working groups within the ARC. The FAA, Alaska Airlines, and Pinnacle Airlines spent a great deal of time, energy		

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	Commenter: Alaska Airlines		
	and money to train 29 airports (11 in Alaska, and 18 in the lower 48) to report and validate the contaminant types and depth relationships on the MATRIX between 2009-2011. Alaska Airlines and Pinnacle Airlines also trained every pilot to use the MATRIX, and to make accurate Braking Action Reports. (This data is available at the FAA Technical Center.) At no time during training or testing was the "Less than 1/8 inch" criteria used or even discussed. As a result of that validation testing, the Validation Team from the FAA distributed the results to the rest of the TALPA ARC in the form of the Final Matrix Vertical and Horizontal (also attached). At some point after that, we were informed by the FAA that the TALPA ARC recommendations would not go through the actual rule making process, but the FAA would implement the TALPA ARC Recommendations, to include the Final Matrix Vertical and Horizontal versions, by Advisory Circular – **without change**. AC 150/5200-28E, JO 7930.2P CHG 1, AC 91-79A, and now AC 25-X Takeoff and AC 25-X Landing all have gone against the recommendations of the TALPA ARC without explanation. This definition change for the depth of		

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	Commenter: Alaska Airlines		
	contaminants on the RCAM in AC 91-79A and AC 25-x is more than significant. It undermines the cornerstone of the work the TALPA ARC did and the two year training and validation project after the TALPA ARC had completed its work. It also puts into question the safe operations of Alaska Airlines, Pinnacle Airlines, Delta, American Airlines, United Airlines, FedEx, Southwest Airlines, and all of the other airlines that have chosen to voluntarily operate under the rules and guidelines that were recommended by the TALPA ARC, and have been using the Final Matrix Vertical or Horizontal for years. Many of these airlines have put considerable expense into developing aircraft performance tools that match the Final Matrix from the 2011 validation meeting. The RCAM in AC 91-79A and AC 25-X Takeoff and Landing must be revised back to the values that were included in the original TALPA ARC Matrix, and are repeated in the Final Matrix Vertical and Horizontal values as agreed upon by the TALPA ARC validation team in the spring of 2011.		

DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: United Airlines		
1.	Revise to TALPA ARC recommendations. Runway Condition Code 5 Runway Surface Condition Description should read 1/8" or less (3 mm) depth of: Slush, Dry snow, Wet snow. Runway Condition Code 3 Runway Surface Condition Description should read Greater than 1/8" depth of: Dry snow, Wet snow. Runway Condition Code 2 Runway Surface Condition Description should read Greater than 1/8" depth of: Water, Slush.	The recommended changes in this table will enable the AC to be consistent with TALPA ARC recommendations and will align with early ARC adopters implementations, including United Airlines, who are currently using "1/8 inch or less" and "greater than 1/8" within the described runway condition codes.	We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).
2.	Include Guidance to manufacturers to develop operator specific auto-brake data, consistent with operators training and guidelines, to reflect use of auto-brakes in their normal operations. This could likely include software operators could use to develop their own braking distances, consistent with both TALPA ARC and operational practices.	Use of data assuming auto-brake to full stop, as is currently provided by the manufacturers, does not reflect the reality of how aircraft are flown and will cause confusion to line pilots and a distrust of the data. In addition, use of a 15% factor on Dry/Wet runway surfaces aggravates this auto-brakes problem, and creates unwelcome deceleration rates on shorter runway lengths without increasing aviation safety.	We do not concur with this comment as it is beyond the scope of this AC. The FAA cannot instruct manufacturers to "develop operator specific auto-brake data, consistent with operators training and guidelines, to reflect use of auto-brakes in their normal operations." Operators training and procedures vary from operator to operator. We believe the correct forum for this type of guidance is the IATA Airplane Performance Task Force and SCAP working committee. We passed your comment on to Flight Standards (AFS-200) for consideration.

DISPOSITION OF PUBLIC COMMENTS

AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: American Airlines		
1.	Revise 1/8 inch threshold to TALPA ARC recommendations. Runway Condition Code 5 Runway Surface Condition Description should read 1/8" or less (3 mm) depth of: Slush, Dry snow, Wet snow. Runway Condition Code 3 Runway Surface Condition Description should read Greater than 1/8" depth of: Dry snow, Wet snow. Runway Condition Code 2 Runway Surface Condition Description should read Greater than 1/8" depth of: Water, Slush. This will be consistent with TALPA ARC recommendations and will align with American Airline's current runway condition matrix. Depths of "Less than 1/8 inch" will not be reported by airport operations. As a result of the FAA's change to the RCAM in AC91-79A and AC 25-X, this will force the airports to code the runway as a 2/2/2 for any reported depth of slush or standing water, and a 3/3/3 for any reported depth of Dry or Wet Snow when full implementation occurs.	This will be consistent with TALPA ARC recommendations and will align with American Airline's current runway condition matrix. Depths of "Less than 1/8 inch" will not be reported by airport operations. As a result of the FAA's change to the RCAM in AC91-79A and AC 25-X, this will force the airports to code the runway as a 2/2/2 for any reported depth of slush or standing water, and a 3/3/3 for any reported depth of Dry or Wet Snow when full implementation occurs.	We concur with this comment, and we changed the AC. Wet runway performance is assumed when water or loose contaminant depth is 1/8″ (3 mm) or less; the wheel braking performance due to the loose contaminant is assumed when the depth of the loose contaminant is greater than 1/8″ (3 mm).

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	Commenter: American Airlines		
2.	American Airlines is concerned on the lack of guidance on how manufacturers should develop autobrake performance. There is no mention of use of autobrakes absent paragraph 8.3.5 pertaining to timing of application during the transition to full braking mode (while there is a whole section on how to develop credit for thrust reverser). Paragraph 5.4 explicitly states "For use in time-of-arrival landing performance assessments, where the conditions at the time of arrival are known and explicitly taken into account, and a smaller operational factor is applied, it would be beneficial if the landing performance data be representative of normal operations." If it is the intent of the FAA to allow the manufacturers to work with operators to define "normal operations" then the concern is alleviated. Operators do not train pilots to use autobrakes to full stop. A more reasonable method to development of autobrake data would be to consider use of autobrakes to a specific speed (e.g., 60 knots) followed by maximum manual braking. This will provide a more real-world estimate of autobrake performance. Use of data assuming autobrake to full stop does not meet reality and will cause confusion among our pilots damaging the credibility of the entirety of the data.		We do not concur with this comment as it is beyond the scope of this AC. The AC discusses which deceleration devices that the manufacturer/data provider should consider and for which to provide data. It is expected that the manufacturer/data provider use good judgment in determining how this data should be created and presented. We recommend this data is consistent with recommended procedures to the greatest degree possible.

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AC 25-32, *Landing Performance Data for Time-of-Arrival Performance Assessments*

Prepared by Paul Giesman, ANM-111

No.	Comment	Requested Change	Disposition
	Commenter: American Airlines		
3.	American Airlines has invested heavily in the TALPA ARC process. The change in plans from rule-making to advisory material is acceptable to American Airlines and we want to work with industry and the FAA for a smooth transition. American Airlines strongly recommends that the FAA make use of available industry experience and expertise in implementation of the TALPA ARC designed Time-of-Arrival landing performance assessment data and process. Absent a collaborative effort, American Airlines reserves the right to comment on previously released advisory circulars pertaining to TALPA ARC data implementations as each draft advisory circular is released. These advisory circulars are interconnected and it is difficult to know what may be important until the entire package is released and we have a view of the big picture.		We do not concur with this comment as it is beyond the scope of this AC. The comment has been noted and passed on to the TALPA ARC implementation team.

No.	Comment	Requested Change	Disposition
	Commenter: National Transportation Safety Board (NTSB)		
1.	However, the NTSB is disappointed that the FAA does not plan to undertake rulemaking to require turbojet operators to use a standardized methodology and FAA-approved data to perform takeoff and landing distance assessments for operations on wet or contaminated runways. Although many manufacturers, operators, and airports have elected to incorporate elements of the TALPA ARC recommendations that will improve industry operations and safety, the ACs provide guidance material only. Since the planned AC content is neither mandatory nor regulatory, the recommended data to support takeoff and landing distance assessments may or may not be developed. If the data are developed and optional assessments are performed, operators remain free to choose the performance data basis, the means of correlating the airplane's braking ability with runway surface conditions, and the added safety margin, if any. The FAA has no plan to approve existing or future performance data developed by TC holders to support takeoff and landing distance assessments or the accompanying calculation methods that may inadvertently or purposely deviate from the TALPA ARC recommendations. As a result, it is likely that many components of the		The NTSB comments on the AC have been noted, and the letter they provided is in proper channels to be answered directly. As to the final point of this comment, the TALPA ARC did include recommendations for 14 CFR part 23 implementation. The NTSB's concerns with part 23 apparent inaction will be forwarded to the appropriate directorate.

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	Commenter: National Transportation Safety Board (NTSB)		
	FAA's AC guidance will be ignored by segments of the intended audience, even if it is consistent with the TALPA ARC's vision. In addition, both ACs are aimed at transport category airplanes, but the guidance should, at a minimum, extend to all turbojet airplane operations.		
2.	One technical problem that should be addressed within the ACs is their reliance, in part, on the wheel braking coefficient model codified in Section 25.109(c) for wet runway stopping performance calculations. However, the Section 25.109(c) model has never been validated by flight test data. To its credit, the FAA has recognized that the wheel braking coefficient model in Section 25.109(c) might be insufficiently conservative, as evidenced by the recent FAA Aviation Rulemaking Advisory Committee (ARAC) tasked to provide recommendations regarding new or updated standards for airplane performance and handling qualities. Under the subject area of Takeoff and Landing Performance, subtask (b) addresses wet runway stopping performance: b. Wet runway stopping performance. Recent landing overruns on wet runways have raised questions regarding current wet runway stopping performance requirements and		The FAA tasked an ARAC working group with investigating wet runway issues. The FAA will react to the recommendations of this body when they have been formulated. However, we do not agree with delaying implementation of the TALPA ARC recommendations until that working group has completed its tasking.

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	methods. **Analyses indicate that the braking coefficient of friction in each case was significantly lower than expected for a wet runway (i.e., lower than the level specified in FAA regulations).** Consideration should also be given to the scheduling of landing performance on wet porous friction course and grooved runway surfaces. Recommendations may include the need for additional data gathering, analysis, and possible rulemaking. [emphasis added] The NTSB encourages the FAA to perform flight tests on representative domestic and international runways that support turbine-powered airplane operations in order to validate the wet-ungrooved and wet-grooved wheel braking coefficient models in Section 25.109(c). The NTSB believes that issuing these draft ACs relying on the untested and potentially insuffuciently conservative models in Section 25.109(c) is premature. The suggested ARAC flight test validation work should be used to update the wheel braking coefficients appropriate for wet runway operations.		

No.	Comment	Requested Change	Disposition
	Commenter: National Transportation Safety Board (NTSB)		
3.	Another technical problem within the ACs arises for certain runway surface conditions characterized as Wet. The ACs define a Wet runway surface condition with good braking action and a wheel braking coefficient calculated by the method in Section 25.109(c), as well as a Wet ("Slippery When Wet") runway surface condition with medium braking action and a wheel braking coefficient of 0.16. Designating a runway as "Slippery When Wet" requires that it be tested using a calibrated Continuous Friction Measuring Equipment (CFME) device, and the resulting friction coefficient found to be below some threshold value. However, because the wet runway friction coefficients specified in Section 25.109(c) have never been validated by flight test, the association of these coefficients with airplane stopping performance capability on runways with CFME friction measurements above a target threshold is unproven. Furthermore, many international runways and smaller domestic runways that support turbojet operations will not have a friction maintenance program, and might therefore not get tested. The NTSB believes that untested runways should be designated as "Slippery When Wet" until and unless (1) the 5 runways have been tested and		The FAA tasked an ARAC working group to investigate wet runway issues. The FAA will react to the recommendations of this body when they have been formulated. However, we do not agree with delaying the implementation the TALPA ARC recommendations until that working group has completed its tasking. As to the inclusion of "Slippery when Wet," the FAA agrees with many of the NTSB's specific points. However, the TALPA ARC felt, and the FAA concurs, that it is better at a minimum to supply some guidance that has the potential of identifying a worse than nominal wet runway and, therefore, have operators take actions to mitigate the possible worse than expected wheel braking on a wet runway. We recognize the tools to do this are less than optimal and are optimistic the ARAC working group will be able to determine a better course of action for the future. FAA Flight Standards (AFS-200) has also addressed this topic to some degree in SAFO 15009, dated 8/11/15.

No.	Comment	Requested Change	Disposition
	Commenter: National Transportation Safety Board (NTSB)		
	shown to meet the minimum CFME friction coefficient threshold, and (2) the CFME measurements have been shown to correlate to a minimum wheel braking coefficient developed by airplanes on wet runways deemed to be adequately maintained. This procedure would result in more conservative estimates of airplane stopping distance required on runways with undocumented friction characteristics until a proper CFME friction survey could be conducted and the results could be reliably correlated to airplane stopping performance.		
4.	Finally, the NTSB suggests that the ACs would benefit from several specific examples to show how appropriate takeoff and landing performance data should be developed; how it could be packaged to suit individual operator requirements in tables, graphs, and/or software applications; and how it should be used by operators, dispatchers, and/or flight crews to perform the takeoff and landing distance assessments recommended by the TALPA ARC. Existing precedent in FAA AC guidance that illustrates the value of providing representative industry examples to the target audience is contained in AC 120-27E, Aircraft Weight and Balance Control, Appendices 3-5.		We do not concur with this comment and did not revise the AC. The FAA has found that the user of the ACs are TC holders and other data providers. These entities are well aware of how to create takeoff and landing data based on parameters described in these ACs. The rest of the comment beyond the scope of the Takeoff and Landing Performance ACs and really address the manufacturers training on how to use the information they provide in operational documents.