

TP 13267E

**Risk Management of Aircraft Critical
Surface Inspection, Volume 3 of 3
Results of a Survey of U.S. Airline Pilots**

Prepared for:
Transportation Development Centre
Safety and Security, Transport Canada
July 1998



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The contents of this report reflect the views of the authors and not necessarily those of the Transportation Development Centre or the United States Federal Aviation Administration (FAA).



1. Transport Canada Publication No. TP 13267E		2. Project No. (DC 153) 9139/9268		3. Recipient's Catalogue No.	
4. Title and Subtitle Risk Management of Aircraft Critical Surface Inspection, Volume 3 of 3 Results of a Survey of U.S. Airline Pilots				5. Publication Date July 1998	
				6. Performing Organization Document No. 96913	
7. Author(s) D.C. Biggs and G.B. Hamilton				8. Transport Canada File No. ZCD1455-14	
9. Performing Organization Name and Address Sypher:Mueller International Inc. 220 Laurier Ave. West, Suite 500 Ottawa, Ontario K1P 5Z9				10. PWGSC File No. XSD-6-02024	
				11. PWGSC or Transport Canada Contract No. T8200-66556	
12. Sponsoring Agency Name and Address Transportation Development Centre (TDC) 800 René Lévesque Blvd. West 6th Floor Montreal, Quebec H3B 1X9				13. Type of Publication and Period Covered Final	
				14. Project Officer Barry B. Myers	
15. Supplementary Notes (Funding programs, titles of related publications, etc.) Funded by the Federal Aviation Administration (FAA). Volume 1 is the main report, <i>Risk Management of Aircraft Critical Surface Inspection, Methodology for Evaluating Comparative Risks</i>. Volume 2 covers the results of a survey of Canadian airline pilots.					
16. Abstract <p>This study evaluated the comparative risks of conducting pre-take-off inspection based primarily on visual observation, point detection sensor systems, or remote detection sensors. In this phase of the project, a methodology to evaluate the comparative risks was developed and applied using limited currently available data. Deficiencies in the data were identified and the additional data that should be collected to complete the analysis were recommended. Current regulations, airline procedures, sensor systems, and effects of fluid failure on aerodynamic performance and the likelihood of an accident were reviewed. Risk analysis trees were developed and fluid failure progression data were analysed to determine the risks. The study also included surveys of Canadian and U.S. pilots regarding clean wing inspection procedures, deicing frequencies, and their assessment of fluid failure.</p>					
17. Key Words Risk analysis, icing, inspection, sensor, aircraft, deicing, pilot				18. Distribution Statement Limited number of copies available from the Transportation Development Centre	
19. Security Classification (of this publication) Unclassified	20. Security Classification (of this page) Unclassified	21. Declassification (date) —	22. No. of Pages vi, 162, app	23. Price —	



1. N° de la publication de Transports Canada TP 13267E		2. N° de l'étude (DC 153) 9139/9268		3. N° de catalogue du destinataire	
4. Titre et sous-titre Risk Management of Aircraft Critical Surface Inspection, Volume 3 of 3 Results of a Survey of U.S. Airline Pilots				5. Date de la publication Juillet 1998	
				6. N° de document de l'organisme exécutant 96913	
7. Auteur(s) D.C. Biggs et G.B. Hamilton				8. N° de dossier - Transports Canada ZCD1455-14	
9. Nom et adresse de l'organisme exécutant Sypher:Mueller International Inc. 220 Laurier Ave. West, Suite 500 Ottawa, Ontario K1P 5Z9				10. N° de dossier - TPSGC XSD-6-02024	
				11. N° de contrat - TPSGC ou Transports Canada T8200-66556	
12. Nom et adresse de l'organisme parrain Centre de développement des transports (CDT) 800, boul. René-Lévesque Ouest 6 ^e étage Montréal (Québec) H3B 1X9				13. Genre de publication et période visée Final	
				14. Agent de projet Barry B. Myers	
15. Remarques additionnelles (programmes de financement, titres de publications connexes, etc.) Financée par la Federal Aviation Administration (FAA). Le volume 1 est le rapport principal, <i>Risk Management of Aircraft Critical Surface Inspection, Methodology for Evaluating Comparative Risks</i> . Le volume 2 renferme les résultats d'un sondage mené auprès des pilotes de ligne canadiens.					
16. Résumé <p>Cette étude a consisté à évaluer les risques comparatifs associés à une inspection avant le décollage fondée principalement sur l'observation visuelle, sur un système de capteurs ponctuels, ou sur la détection à distance. La présente phase visait l'élaboration d'une méthodologie d'évaluation des risques comparatifs et sa mise en oeuvre à l'aide des données actuellement disponibles. Ayant cerné les trous dans ces données, les chercheurs ont formulé des recommandations quant aux compléments de données à acquérir pour terminer l'analyse. Les travaux ont comporté, outre le survol de la réglementation en vigueur et des procédures en usage dans les compagnies aériennes, l'examen des systèmes de capteurs et l'étude des effets de la dégradation des agents antigivrage sur les caractéristiques aérodynamiques de l'aéronef et sur la probabilité d'un accident. Des arbres d'analyse de risques ont été construits et appliqués aux données concernant la propagation de la perte d'efficacité des liquides antigivrage. L'étude a également consisté à sonder les pilotes canadiens et américains sur les procédures d'inspection des aéronefs avant le décollage, la fréquence des dégivrages, et leur appréciation de la cessation d'efficacité des agents antigivrage.</p>					
17. Mots clés Analyse du risque, givrage, inspection, capteur, aéronef, dégivrage, pilote				18. Diffusion Le Centre de développement des transports dispose d'un nombre limité d'exemplaires.	
19. Classification de sécurité (de cette publication) Non classifiée		20. Classification de sécurité (de cette page) Non classifiée		21. Déclassification (date) —	22. Nombre de pages vi, 162, ann.
					23. Prix —

Acknowledgments

The assistance of Mr. Ed Pugacz (FAA), Captains W. Lockhart, J. Wright and F. Flood (Airline Pilots Association) and Mr. Walter McLeish (Aerodevco Consultants Ltd.) in developing the questionnaire, and the Airline Pilots Association in distributing the questionnaires, is gratefully acknowledged.



**RISK MANAGEMENT OF AIRCRAFT CRITICAL
SURFACE INSPECTION, VOLUME 3 OF 3
RESULTS OF A SURVEY OF U.S. AIRLINE PILOTS**

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Glossary of Terms

AC	Advisory Circular
ARP	Aerospace Recommended Practice (SAE)
ATC	Air Traffic Control
Critical Surfaces	Wings, control surfaces, rotors, propellers, horizontal stabilizers, vertical stabilizers or any other stabilizing surface of the aircraft critical to the aerodynamic performance of the aircraft
FAA	Federal Aviation Administration
Fluid Failure	Fluid failure is the term currently used to describe a condition of visible ice crystal contamination on or in the anti-icing fluid film covering a surface, with crystal absorption taking place at a slower rate than the precipitation rate of the contaminating material.
Holdover Time	Holdover time is the estimated time the anti-icing fluid will prevent the formation of ice and frost and the accumulation of snow on the treated surfaces on an airplane; official values for each fluid type are derived from standardized field and laboratory tests, and are published in (SAE) Holdover Time Tables.
HOT	Holdover time (as above)
PIC	Pilot In Command
Pireps	Pilot reports
Pre-Takeoff Inspection	Inspection of critical surfaces made immediately prior to takeoff
Representative Surfaces	Surfaces identified by the manufacturer that can be readily and clearly observed by the flight crew during day and night operations and are suitable for judging whether critical surfaces are contaminated or not.
SAE	Society of Automotive Engineers
TC	Transport Canada

1. BACKGROUND

The occurrence of a number of accidents in the last decade has increased concerns about the risks of takeoff in ground icing conditions. Regulatory authorities have enacted regulations, and airlines and pilots have improved procedures for ensuring the aircraft is free of frozen contaminants prior to takeoff. Improvements in anti-icing fluids have increased holdover times, thus reducing the risk of fluid failure prior to takeoff. The poor viewing conditions of the wing from either the flight deck or cabin is no doubt a significant factor in assessing fluid failure and/or the existence of wing contaminant. With the advent of sensors capable of identifying fluid failure, Transport Canada (TC), with the support of the United States Federal Aviation Administration (FAA), has initiated a project to:

Evaluate the comparative risks of conducting pre-takeoff inspection based primarily on visual observation, point detection sensor systems, or remote detection sensors.

As part of this project, Sypher conducted surveys of airline pilots in Canada and the US. The purpose of the surveys was to improve our understanding of the current wing inspection process and its strengths and weaknesses, and to obtain feedback on the need for additional measures (such as training, operating procedures and/or detection devices). The survey of airline pilots in Canada was conducted in June 1997 and the results are reported in Volume 2 of this report.

1.1 The Survey

The survey of US pilots was supported by the Airline Pilots Association (ALPA), the FAA and TC, and ALPA assisted in the distribution of the questionnaires. Pilots were asked not to identify themselves or their employer.

The survey questionnaire was mailed out to 7,000 airline pilots randomly selected from councils in the Northeast, Midwest and Northwest in April 1998; 1,574 pilots completed the questionnaire, with a response rate of 22%. The survey provides a wealth of information about current de/anti-icing and inspection procedures. The survey questionnaire is given in Appendix A. The results of the survey are summarized below and a detailed breakdown of the responses and comments to each question are given in Appendix B.

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2. RESULTS OF THE SURVEY

These findings are based on the responses to questions on the questionnaire and the interpretation of comments made by pilots on the questions. The opinions obtained from the comments are not necessarily representative of the survey population, nor have they been fully weighted for their frequency of occurrence or the type and level of experience of the respondent. Detailed results for each question, including comments by pilots, are given in Appendix B.

All findings relate only to pilots of air carriers registered in the US and to standards and procedures in place prior to and during the 1997/98 winter.

2.1 General

Most pilots (76%) feel that changes over the past five years in de/anti-icing regulations and procedures have either greatly or moderately improved safety (see Figure 2.1). However, pilots of turboprop aircraft generally find the effects of these changes on safety to be less than pilots of jet aircraft. Some comments frequently expressed about the effect of these changes were:

- “greater awareness of dangers”, both by pilot and the company;
- “improved fluids and longer holdover times, especially Type IV”;
- “greater efforts by ground personnel”;
- “cut and dry decisions”;
- “remote deicing followed by immediate departures more common”;
- “improved education and holdover time guidance”;
- “gone overboard, many deicings unnecessary, created waste”.

Many pilots are unhappy that some procedures take authority away from the pilot and many commented that further reductions in time between deicing and takeoff through remote deicing pads, better deicing facilities and better air traffic control (ATC) coordination are required.

Almost all pilots agree that the wider availability and use of Type II and IV anti-icing fluids have improved safety, especially Type IV. “At the busier overcrowded airports, the longer holdover times are a must”. The most common concern is that only Type I fluid is available at many stations or that Type IV is expensive and rarely used. As one would expect, pilots of turboprop aircraft did not feel that the safety benefits of Type II and IV fluids were as great as pilots of jet aircraft.

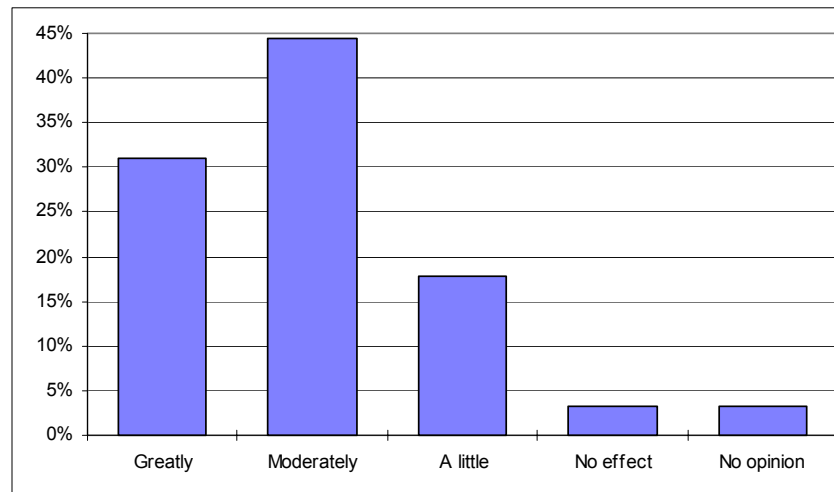


Figure 2.1 Pilots' Views on Whether Changes in De/Anti-icing Standards and Procedures Over Last Five Years Have Improved Safety

Almost 20% of pilots are not comfortable with the de/anti-icing procedures in use today and many others expressed some reservations. One of the common concerns expressed by the pilots was that visual checks of the wings are not effective (others called it “guesswork”, “a joke” or “extremely subjective”), especially at night with fluid over windows. Many mentioned that the procedures are slow and wasteful, and that they are not confident in the training and knowledge of the deicing crew, especially at out-stations and in commuter operations. Too many deicings are still done at the gate rather than at remote pads near the end of the runway. Others mentioned that the final decision to deice should belong to the Captain - not with ground personnel.

Almost all pilots responding to the survey felt that the quality of deicing service varied among airports in North America, half find the variation small, the other half find it moderate or large. Generally, pilots indicated that at small airports/out-stations the equipment is not as good and the deicing staff less experienced than at the larger airports. Also, the deicing service is inferior at airports where deicing is only required infrequently, such as those in the south. Many stated that the widest variation is in the speed and efficiency rather than the quality of fluid application. However, many pilots indicated that even between airports of similar size and location there is significant variation in the service provided.

Remote deicing pads using the gantry or “car wash” deicing systems located near the end of the runway “are the way to go” according to many pilots. The pilots were asked to give several examples of airports providing the best and worst deicing service; the results are summarized in Table 1.

Table 2.1 Examples of Airports Providing the Best and Worst Deicing Service

WORST AIRPORTS	Frequency	BEST AIRPORTS	Frequency
Detroit (DTW)	76	Denver (DIA)	298
Chicago O'Hare (ORD)	72	Pittsburgh (PIT)	278
New York (LGA)	69	Chicago (ORD)	176
Minneapolis/St.Paul (MSP)	40	Minneapolis/St.Paul (MSP)	160
Denver (DIA)	39	Detroit (DTW)	117
New York (JFK)	37	St. Louis/Lambert (STL)	74
St Louis/Lambert (STL)	36	Toronto Pearson	32
White Plains (HPN)	25	Montreal-Dorval (YUL)	25
Memphis (MEM)	20	Ottawa (YOW)	17
Boston (BOS)	20	Paris (CDG)	11

There is much greater consensus on those airports providing the best service than those providing the worst service. The new facilities at Denver and Pittsburgh were consistently identified as being the best. Charles de Gaulle airport in Paris also received a high number of votes given the small number of pilots that would have flown there. The eastern Canadian airports were also identified as providing very good service. Chicago O'Hare, Minneapolis/St.Paul, Detroit and St. Louis/Lambert were among those most frequently identified as providing the best service, but were also among those frequently identified as providing the worst service (also true of Denver to a lesser extent). Variation in service at the one airport could be due to factors such as differences between deicing service providers at that airport, or to procedures which work well if the pilot is very familiar with them, but poor if they are unfamiliar with them.

2.2 Experience

Almost twenty aircraft types were flown by pilots responding to the survey, the most common being DC9s, B727s, A320s and B737s. All sizes (19 to 400 seats) and configurations (high/low wing, 2/3/4 engines, and engines located on wing/rear fuselage) were represented. The overall experience and the deicing and re-deicing experience of U.S. airline pilots responding to the survey are summarized by aircraft type in Table 2.2. Pilots responding to the survey were, for the most part very experienced, 70% with over ten years experience as an airline pilot operating in areas subject to ground icing.

The number of departures per year by a pilot decreased with size of aircraft he/she flies from around 1,000 for small commuter aircraft to about 150 for large jet aircraft. The frequency of deicing and re-deicing varied with number of departures. Most pilots indicated that their aircraft was deiced prior to between 2% and 6% of departures (average 3.7%), or about 10% to 30% departures during sub-zero temperatures. The

percentage of times that the aircraft was re-deiced following the initial de-icing was low, about 2.3%.

Table 2.2 Summary of Deicing and Re-deicing Experience of Pilots by Category of Aircraft

Type of aircraft you currently fly		No. of departures per year	No. of hours flown per year	No. of times aircraft was deiced during this winter	No. of times aircraft was re-deiced this winter due to possible fluid failure	No. of years you have been an airline pilot	% of departures at sub zero temperatures (OAT)
B727	Mean	437	754	12.8	0.32	15	16%
	# Resp.	168	196	201	201	201	201
B737	Mean	471	748	20.6	0.34	11	19%
	# Resp.	134	157	157	155	157	157
B747	Mean	127	709	3.4	0.12	21	14%
	# Resp.	83	86	87	86	87	87
B757	Mean	325	737	9.3	0.12	16	15%
	# Resp.	104	120	120	119	120	120
B767	Mean	292	706	8.5	0.14	19	15%
	# Resp.	97	111	112	112	112	112
B777	Mean	129	667	4.5	0.22	21	19%
	# Resp.	43	44	46	46	46	46
DC9	Mean	548	758	17.9	0.42	15	19%
	# Resp.	226	256	257	257	257	257
DC10	Mean	200	736	7.1	0.20	20	14%
	# Resp.	117	132	136	136	136	136
MD80-90	Mean	360	740	11.2	0.08	19	17%
	# Resp.	97	116	117	116	117	117
A300	Mean	150	833	32.7	0.00	13	2%
	# Resp.	2	3	3	3	3	3
A320	Mean	321	714	9.3	0.12	14	15%
	# Resp.	131	158	160	160	160	160
A340	Mean	600	800	100.0	10.00	12	40%
	# Resp.	1	1	1	1	1	1
BAe Jetstream	Mean	880	777	23.6	1.34	5	21%
	# Resp.	41	50	50	50	50	50
Saab 340	Mean	759	827	45.5	0.91	5	22%
	# Resp.	36	49	49	46	49	49
ATR 42	Mean	775	750	12.0	0.00	1	65%
	# Resp.	1	1	1	1	1	1
ATR 72	Mean	676	775	34.4	1.22	8	27%
	# Resp.	35	38	38	37	38	38
DH-8	Mean	833	848	94.5	2.50	6	25%
	# Resp.	9	10	10	10	10	10
Beech 1900	Mean	1118	1023	140.0	2.00	8	21%
	# Resp.	7	7	7	6	7	7
Other	Mean	483	793	19.4	0.25	16	23%
	# Resp.	7	8	8	8	8	8
Total	Mean	408	743	15.2	0.35	15	17%
	# Resp.	1339	1543	1560	1550	1560	1560

Just under 40% of the pilots indicated that on no occasion during the past two winters did their holdover time (HOT) expire (see Figure 2.2). For those pilots whose HOTs did expire, the frequency for most pilots was five or less (over two years). Therefore, pilots' exposure to situations where the fluid could possibly have failed is low for most pilots. When the HOT did expire during precipitation, the pilots indicated that the aircraft was re-deiced about 10% of the time. Thus, most pilots would very rarely see fluid failure, and will therefore not learn about fluid failure "on the job".

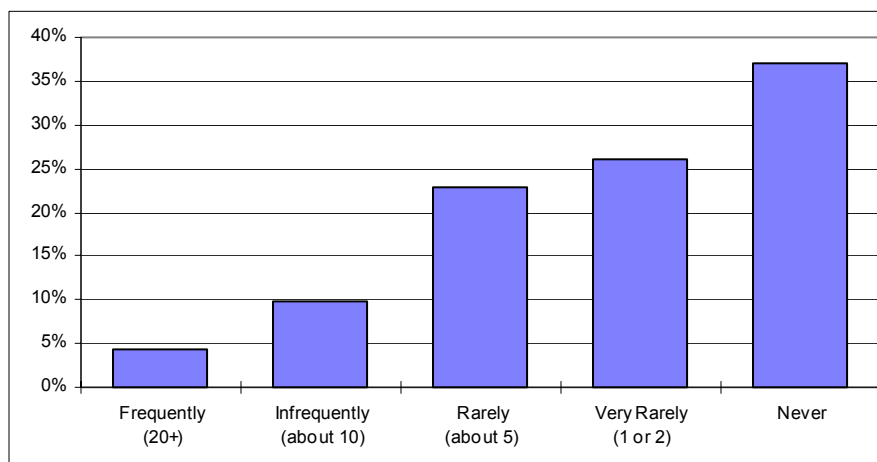


Figure 2.2 Frequency Holdover Time Expired During Precipitation During the Past Two Winters

2.3 Training

Training on the recognition of fluid failure varies between pilots and overall is inadequate. As shown in Figure 2.3, less than 60% of pilots have received verbal instruction on the recognition of fluid failure and only about a third have been shown colour pictures or videos of the failure failing. Very few have seen the fluid failure process live.

When asked to describe how they recognize fluid failure only 83% could give a response for failure during snowfall, and only 75% for failure during freezing rain/drizzle or ice pellets. Some of these, about 2%, did not really answer the question (e.g., response of "visually"). Of the pilots that responded, the responses indicate that most have a general idea of what to look for and they mentioned one of the several properties to look for. Many were confused between the most important failure properties during snowfall and FZRA/FZDZ, and many commented that it is more difficult in freezing precipitation. Clearly, if pilots are expected to assess the condition of the wing during the pre-takeoff check, better training on the recognition of fluid failure is required.

Over a third indicated that their training on ground deicing was not fully satisfactory, the large majority of these indicating better training on recognizing fluid failure was needed. Many pilots, including those that stated their training was fully satisfactory, mentioned that colour photos, videos and live demonstrations of fluid failure would be helpful.

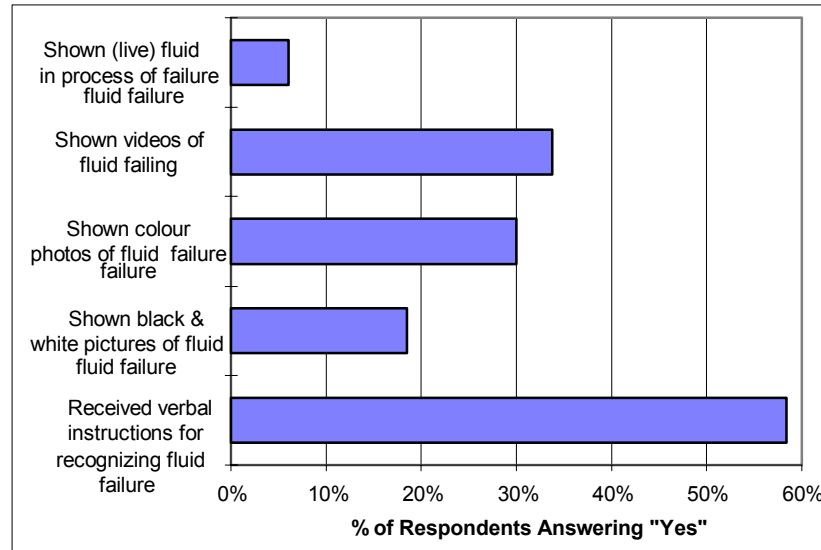


Figure 2.3 Types of Instruction Used in Training on Recognition of Fluid Failure

2.4 Ground Crew Performance

About a quarter of the pilots indicated that during the past winter season they had reason to question the quality or capability of deicing service provided to aircraft. Common items mentioned were disagreement on whether or not deicing was necessary, suspected incomplete or poor quality deicing of aircraft, insufficient information on fluid type/mix provided, had to insist on the type of fluid to be used, and poor communication with ground crew. A number of pilots who had problems indicated that better training of ground crew is required.

Two thirds of pilots are very confident that their aircraft is clean when cleared by the ground deicing crew. Many pilots indicated that their company ground deicing crew are “excellent”, “first rate”, “well trained” and “very competent”. Pilots indicating they were fairly confident commented that it depends on the crew and location, and that they are less confident using contract personnel. The few pilots (4%) not confident that their aircraft is clean commented that they have found ice on the aircraft after deicing and that the ground deicing staff are understaffed, overworked, and poorly paid.

Most pilots (65%) indicated that they are informed of the type of fluid in use for deicing and anti-icing without specifically asking at all airports, while a further 30% are informed at some, but not all airports. The latter group indicated that it varies between airports and between deicing crews. Contract personnel more often don't give the required information than company personnel and pilots often have to ask at out-stations. Many mentioned that the brand of Type IV sometimes is not given (brand is important for Type IV as HOT varies by brand of fluid for that type). Several called for standardized procedures, including between countries, especially the US and Canada.

2.5 Assessment of Condition of the Wing in Pre-takeoff Contamination Checks

Representative Surfaces

Over 60% of pilots indicated that their airline designated representative surfaces for assessing fluid failure for their aircraft. The large majority (70%) found that these representative surfaces represent the surface conditions of the wing well. However, many commented that “the representative surface is the wing” and were not referring to designated sections of the wing. About 5% indicated that the representative surfaces poorly represent the condition of the wing. Most comments related to the difficulty in viewing the wing and assessing fluid failure through the cabin windows. Unlike the survey of pilots in Canada, few pilots gave examples of when designated representative surfaces did not represent the condition of the wing. A number of pilots mentioned that assessment of the conditions is easier on black surfaces, but one pilot cautioned that black surfaces absorb more heat and are often clean when the rest of the wing is contaminated.

Factors Affecting Assessment

The two most important factors affecting the pilots' assessment of the condition of the wing both related to lighting; namely the direction of the lighting and the availability of only wing and emergency lighting (at night). The next most important factor mentioned was de/anti-icing fluid on the windows. Wing span and, on some aircraft, the option to open the door or cockpit window was important. Other factors frequently mentioned include: high wing aircraft, position in aircraft and passengers in the way, glare on cabin window, viewing angle, and use of a flashlight. Many pilots stated that visually identifying ice or fluid failure from inside the aircraft at night is next to impossible and that a tactile check, or at least a visual check from outside the aircraft with proper lighting, is required.

Confidence in Assessment

Pilots, for the most part, have high confidence in their ability to recognize fluid failure during snowfall in daylight. However, at night with no external lighting, such as the end of the runway, their confidence is very low to medium. Their confidence decreases

slightly during heavier snowfall. During freezing rain at night with no external lighting, almost 60% of pilots have very low confidence in their ability to recognize fluid failure, and a further 27% have low confidence. These confidence levels vary marginally between aircraft types and tend to be higher for low wing than high wing aircraft. Average confidence levels¹ of accurately identifying fluid failure over the range of conditions are shown in Figure 2.4. For comparative purposes, confidence in their identifying clear ice over fuel tanks is higher than for identifying fluid failure at night in freezing rain. Clearly, relying on visual inspection of the wings to maintain safety is insufficient, especially at night and during freezing rain/drizzle conditions.

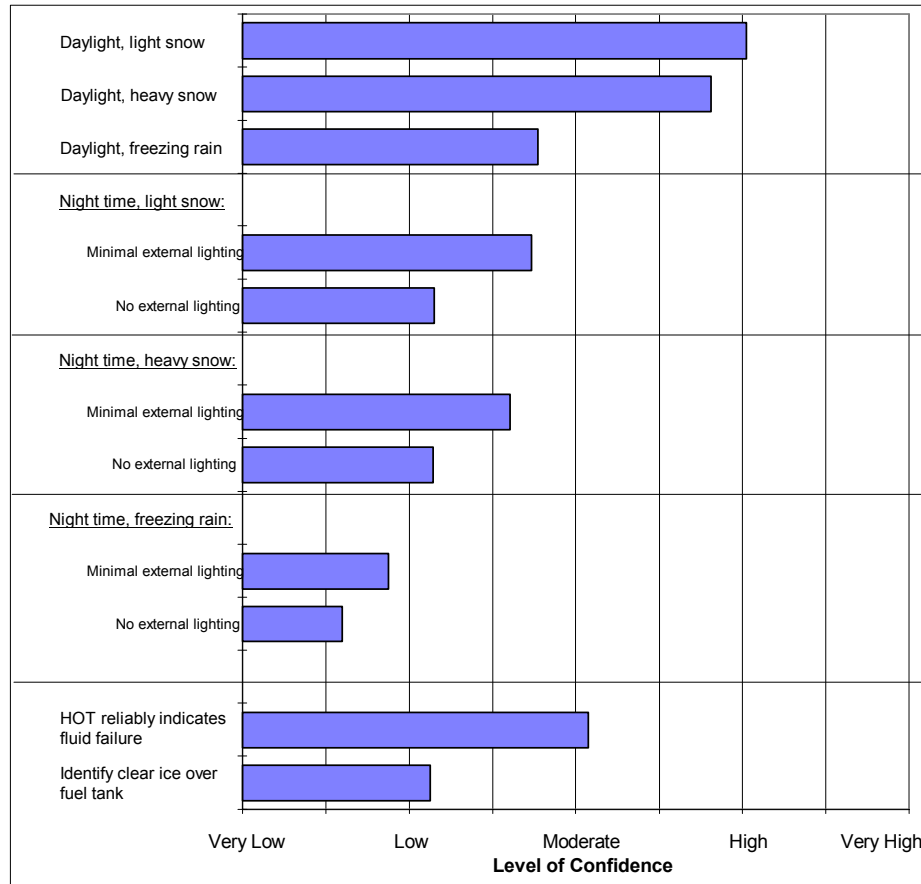


Figure 2.4 Average Confidence Levels of Accurately Identifying Fluid Failure In Various Conditions and Confidence in HOTs and of Identifying Clear Ice Over Fuel Tanks

¹ Average found by assigning confidence levels a numerical value (very low=1, low=2, moderate=3, high=4 and very high=5) and taking the average of these values over all pilots.

Most pilots (74%) have medium to high confidence that the HOTs reliably indicate the earliest the fluid could fail. Pilots in Canada have greater confidence in the HOTs and rely on them more than pilots in the US.

The large majority of pilots indicated that they are conservative in their decision on whether to re-deice when visibility of the wing is poor. Most (80%) indicated that if they were unable to identify any fluid failure, but the condition of the fluid was somewhat difficult to see and the HOT and precipitation rate indicate that the fluid could possibly have failed, they would return to deice. In a similar situation, but with the condition of the fluid very difficult to see, 97% indicated they would return to deice. About 25% were very conservative indicating that, irrespective of the HOTs, if viewing conditions were poor and there was any doubt, they would return to re-deice. A number of pilots indicated that rather than re-deice, they would have a tactile or external visual inspection done. Many commented that in poor viewing conditions they rely greatly on the HOT and that the type and rate of precipitation is very important in making their decision to re-deice.

Location and Method of Inspection

Most pilots (83%) are not able to assess the condition of the critical surfaces from the cockpit. Aircraft types where the majority of pilots indicated that checks can be made from the cockpit were the DH-8, Beech 1900, Saab 340 and BAe31. About half the pilots who had the choice found it better to make their check from the cabin. Those who found the cabin and cockpit similar indicated they would only go back to the cabin 25% of the time.

Most pilots of high wing aircraft (70%) do not open the door to visually check the upper wing surface. About 20% use this option when conditions warrant a close inspection, such as when HOT has expired, while 9% routinely open the door to visually inspect the wing. Pilots of the ATR 72 are the most likely to open the door, while none of the 10 pilots of DH-8s indicated that they opened the door to check the wing. An important factor in the use of the door is its location: the door on the ATR is behind the wing, while on the DH-8 the door is in front of the wing.

The large majority of pilots have had tactile checks of the critical surfaces done for deciding whether to deice the aircraft. Almost 20% routinely conduct a tactile check, but most have the tactile check done less than five times a winter. For deciding if the fluid has failed and **re-deicing** is required, a third of pilots have requested a tactile check be done. Of these, about 8% routinely conduct this test, while most have a tactile check done only one or two times per winter.

2.6 Delay In Departing After Visual Check

Pilots were asked how long after the visual check of the critical surfaces just prior to takeoff (pre-contamination check) did they typically take off. On average the time interval was 3.5 minutes for jet aircraft and 2.5 minutes for turboprops. Over 40% of pilots indicated that they occasionally require the full 5 minutes to takeoff after the visual check allowed for in the operating procedures, while another 45% indicated they rarely require the full 5 minutes. It should be noted that risk analyses have shown that delays of more than 5 minutes after the visual check can significantly increase the risks of fluid failure prior to takeoff, especially for Type I fluid.

2.7 Holdover Time Tables (HOTs)

Most pilots (83%) indicated that they find the range given in the HOT tables more useful than a single value. Frequently given reasons for wanting a range were that:

- “weather conditions can vary”;
- “just too many variables for a single value”;
- “each of the weather conditions specified in the table varies with intensity”;
- “allows for pilot judgment and more flexibility”; and
- “range emphasizes that it’s not precise and is only a guide”.

Pilots preferring a single number commented that a single “hard fast” number is easier to work with, that they always use the lowest value and that a range is too subjective. A few pilots indicated that they use the maximum value, while others indicated that their airline only provide a single number.

2.8 Procedures

Use of Type I Fluid for Anti-icing

Over 40% of pilots indicated that Type I fluid is used at some airports for anti-icing. Many pilots indicated that most, or all, non-hubs or outstations used Type I fluid for anti-icing, some indicated that “Type I is all they have”. The most frequently mentioned airports using this practice are given in Table 2.3. The practice of using Type I fluid for anti-icing appears to be fairly wide spread, and includes hubs and outstations, and airports in the north and the south. A number of pilots mentioned that this practice was common a few years ago, but that Types II and IV are now used.

Table 2.3 Frequently Mentioned Airports Using Type I Fluid for Anti-icing

Airport	Latitude	Frequency
STL St. Louis	38	24
DTW Detroit	42	21
MSP Minneapolis	44	19
ORD Chicago	41	18
ROC Rochester	43	11
DEN Denver	39	10
MKE Milwaukee	42	9
SYR Syracuse	43	8
BUF Buffalo	42	8
MEM Memphis	35	8
DSM Des Moines	41	7
CLE Cleveland	41	6
SBN South Bend	41	6
GRB Green Bay	44	5
BOS Boston	42	5
GRR Grand Rapids	42	5
AZO Kalamazoo	42	5
HPN White Plains	41	5
CMH Columbus	39	5
MCI Kansas City	39	5

Quality Management Program

Almost half the pilots are aware that their company has a quality management program to assess the quality or capability of deicing service in accordance with their company's approved de/anti-icing program. Comments by these pilots indicate that the programs vary greatly, both in procedures and effectiveness. Almost half were not aware of such a program, but many of these pilots thought their company would have such a program. Many mentioned that they can always write reports on any problems they encounter. A small number of pilots indicated their company does not have a quality management program.

Takeoff In Freezing Drizzle or Light Freezing Rain

When asked whether their company publishes FAA approved Operations Specifications for their aircraft which allow takeoff in light freezing rain and/or freezing drizzle, 84% of pilots stated "yes". A number emphasized that takeoffs are not allowed in heavier freezing precipitation or that no operations are allowed in severe icing conditions. Only four pilots commented (on this question) that aircraft are not certified to fly in light freezing rain and/or freezing drizzle conditions. Many commented that provided they are within the HOT, takeoff is approved in these conditions, but some mentioned that due to the very short HOTs, operations are impractical. Aircraft with the highest proportion of

pilots indicating approved Operations Specifications are **not** published by their company were the ATR 42, DH-8, B747, ATR 72, Saab 340 and the B757.

Most pilots are clearly very cautious and/or hesitant to takeoff during freezing drizzle and light freezing rain conditions. Even if within the HOT limits, most indicated a visual, or even a tactile, check are required. Many commented that there is fine line between light and moderate freezing rain when determining whether it is safe to takeoff. Sixteen pilots commented on problems associated with runway conditions and aborted takeoffs. Several mentioned that they adjust speeds and rotation to reduce the risks. Eighteen pilots mentioned issues related to airborne icing, including (frequency given in brackets):

- aircraft not certified to fly in icing conditions (7);
- takeoff only if inflight icing not heavier, i.e., not moderate or severe (4); and
- hazards after takeoff (7).

Five made mention of the problems associated with inflight icing with the ATR, e.g., “not in an ATR, are you crazy?”.

Stages of Flight Fluids Provide Anti-icing Protection

Almost all pilots are aware that de/anti-icing fluids do not provide anti-icing protection during final climb and cruise. However, almost a third think that they provide protection during initial climb and over two thirds think it offers protection between rotation and liftoff. Many of the pilots are aware that the fluid is meant to shear-off during the takeoff run, although the presence of fluid on the wing after the takeoff run leads some pilots to thinking it is offering protection during some stages of flight. Several pilots mentioned that once takeoff has commenced, the fluid won't protect the leading edges which are critical for generating lift. Several pilots who think that it provides protection during final climb and cruise commented that they have seen the fluid dripping from wing at their destination.

Assessment of Precipitation

Almost 60% of pilots indicated that their company publishes information for use in determining precipitation intensity (for example, relating visibility in precipitation to precipitation intensity) for snowfall, and just over half for freezing drizzle. However, only 47% of pilots indicated that their company authorizes them to use personal observation of light freezing rain and/or drizzle to supersede a current weather observation. Many pilots commented that they can override weather observations (ATIS) if their personal observation is more conservative. Others mentioned that they can supersede ATIS if conditions have changed since the ATIS report was given.

2.9 Use of Sensors for Identifying Fluid Failure

As shown in Figure 2.5, there is widespread agreement among pilots that the use of sensors for identifying fluid failure would improve safety. Almost 40% of pilots offering an opinion felt sensors would greatly improve safety. Pilots' views on the effect of sensors were surprisingly consistent between pilots of different aircraft types. Pilots of high wing aircraft expressed similar opinions as pilots of low wing aircraft. Despite the general acceptance of the safety benefit of sensors, these benefits were conditional on them being reliable and accurate, not overly sensitive, and giving few false alarms. Many pilots, from past experience with other sensors and warning devices, are skeptical that the required reliability and accuracy are achievable and indicated pilots would need to gain confidence in the sensors before they would trust them. Regarding the use of sensors, frequently expressed views included:

- they should be used as an additional aid to visual inspection; and
- they should be used to give a **no go**, not a **go** situation.

A number of pilots were concerned that spot sensors would not be useful in determining conditions over the whole wing and others didn't feel the improvement in safety would justify the expense.

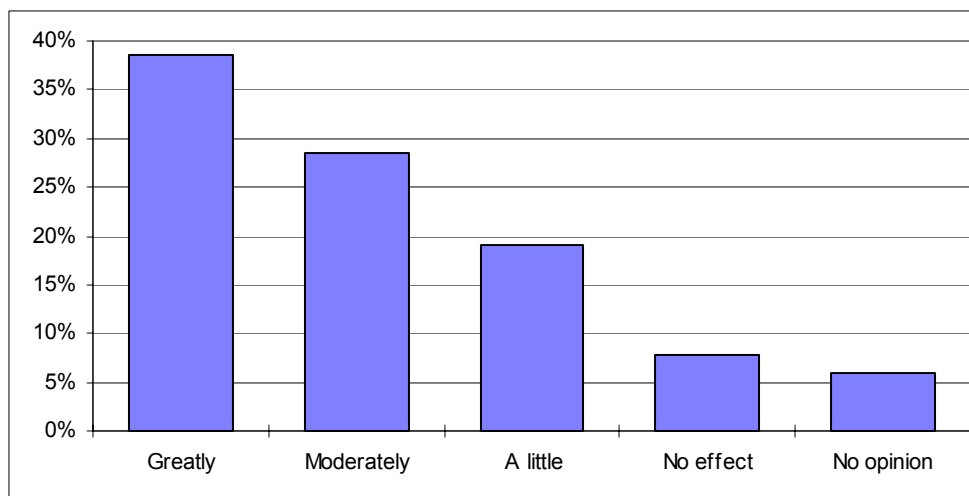


Figure 2.5 Pilots' Views on Whether Sensors Capable of Identifying Fluid Failure Located on Areas of the Wing where the Fluid Typically Fails First Would Improve Safety

2.10 Comparison of Views of Canadian and US Pilots

Generally, pilots in the US viewed the impacts on safety of changes in regulations and procedures over the past five years slightly more favourably than pilots in Canada. A greater percentage of pilots in the US felt the changes had greatly improved safety than in Canada (30% compared to 20%). Both groups had similar views on the safety benefit of the wider availability and use of Type II and IV fluids, but again a slightly higher percentage of pilots in the US indicated the benefit was “great”. Almost identical percentages of pilots in the two countries indicated they were comfortable with the current de/anti-icing procedures in use today.

Canadian pilots answering the survey had a greater number of years of experience as airline pilots operating in areas with ground icing. The proportion of departures where the aircraft was deiced was higher for the Canadian pilots (5.5%) than the US pilots surveyed (3.7%)². Similarly, the proportion of deicings where the aircraft was re-deiced was also higher - 3.3% for Canadian pilots and 2.3% for US pilots. These higher proportions may be due, in part, to the surveys being conducted in different years and the winter being milder prior to the US survey.

A higher proportion of US pilots have been shown colour photos and videos of fluid failure than Canadian pilots, and similarly a higher proportion of US pilots indicated their training is fully satisfactory (63% compared to 50%). Part of the reason for this could be due to the Canadian survey being conducted following the 1996/97 winter, a year earlier than the US survey, and the distribution of material on fluid failure by TC prior to the 1997/98 winter. Similar percentages of US and Canadian pilots were able to describe how to recognize fluid failure.

For pilots in the two countries, there is little difference in pilots’ confidence that their aircraft is clean after being deiced. Similar percentages of pilots indicated that they had reason to question the capability of the deicing service provided.

US pilots do not appear to rely as much on designated representative surfaces for assessing fluid failure as pilots in Canada. Many US pilots considered the representative surfaces to be the whole wing, while in Canada most pilots understand representative surfaces to be designated sections of the wing suitable for judging whether or not critical surfaces are contaminated. Requirements for specifying representative surfaces differ between the US and Canada and may explain the difference in responses found in the surveys.

Canadian and US pilots have very similar confidence in their ability to identify fluid failure under various conditions. Both groups indicated similar importance of the various factors affecting their assessment, although Canadian pilots rated more highly the importance of opening the door or window to get a better view.

² US pilots surveyed were from the Northwest, Midwest and Northeast Councils of ALPA.

Based on the question regarding conditions under which they would return to re-deice, US pilots appear to be more conservative in their decision to re-deice in conditions when it is difficult to see and the HOT and precipitation conditions indicate the fluid may possibly have failed. The question was worded slightly differently on the US survey based on comments received on the question in the Canadian survey, and this may account for the different responses. Alternatively, the greater experience of Canadian pilots in ground icing conditions, or differences in company procedures, may account for the differences.

Canadian pilots have greater confidence that the HOT reliably indicates the earliest the fluid could fail. Almost identical percentages of US and Canadian pilots indicated that they prefer a range of holdover times rather than a single value (83%).

Both Canadian and US pilots had very similar views on the safety benefits of wing mounted sensors capable of identifying fluid failure, and on the conditions under which sensors could be used (must be reliable, no/few false warnings and used in conjunction with visual inspection).

2.11 General Comments and Observations

The general comments made by pilots at the end of the questionnaire overwhelmingly endorse the deicing of aircraft near the runway as the most effective means of improving safety in ground icing conditions. As one pilot stated,

“The ONLY safe way to de/anti-ice is to do it just before takeoff. No holdover time calculations needed, no additional visual checks needed. Get the job done and get out of town!”

Many mentioned the “car wash” system used at Pittsburgh and several European airports as the best types of deicing systems and these airports were among those most frequently identified as providing the best de/anti-icing service. Improved coordination between ATC and deicing providers was also called for.

Pilots generally feel that visual checks of the critical surfaces are a critical element of the safety procedures. However, they acknowledge that currently it is difficult, if not impossible, to assess the condition of the wing using visual inspection from within the aircraft at night. Despite the widespread agreement among pilots that use of sensors for identifying fluid failure would improve safety, few pilots (5% of pilots making general comments) mentioned aircraft mounted sensors as the best way of ensuring the critical surfaces are clean at takeoff. Many more favour having a trained person make either a visual or tactile check from outside the aircraft just before departure. A number mentioned using a device such as the scanning sensor being tested at several airports this winter to check the wings from outside the aircraft during the post-deicing check. Of the

pilots mentioning that sensors would be helpful, many made the qualification that they must be reliable and not give false signals.

If pilots are to continue to make visual checks from inside the aircraft, they would like better training on how to recognize fluid failure, including colour photos and videos, and better light for making visual checks made at night.

Variation in procedures, quality of deicing service and ground crew competency is a problem. The ground crews and deicing services at many airports are excellent; however, based on the pilots' comments, a significant number need improvement, especially at non-hub airports.

3. FINDINGS

The major findings drawn from the results of the survey are given below.

- US pilots feel that the changes in de/anti-icing procedures, standards and fluids over the last five years have significantly improved safety. Similar results were found in the survey of Canadian airline pilots.
- Pilots feel that the long HOTs provided by Type IV fluids have greatly improved the safety margin, but that use of Type I fluid for anti-icing is still fairly widespread and that at many out-stations only Type I is available.
- As with Canadian airline pilots, US pilots cannot make an accurate assessment of the condition of the critical surfaces using visual inspection at night or when visibility is poor, especially during freezing rain/drizzle.
- Training on recognition of fluid failure is inadequate for over a third of pilots; pilots called for greater use of color photographs, videos or live demonstrations.
- Most pilots rarely exceed the HOT and would very rarely see fluid failure and, therefore, would not learn about fluid failure “on the job”.
- Pilots are moderately confident in the accuracy of the HOTs, and generally do rely on them to as greater degree as Canadian airline pilots. Most indicated that they find the range given in the HOT tables more useful than a single value.
- Pilots feel that they and ground crews are conservative in their decision on the need to deice and re-deice aircraft. This reduces the risk of takeoff with contaminated surfaces, but leads to much unnecessary deicing.
- Many pilots feel that the variation in procedures, quality of deicing service and ground crew competency is a problem. The ground crews and deicing services at many airports are excellent; however, a significant number need improvement, especially at non-hub airports.
- The delay between the pre-takeoff check and takeoff is, on average, 3.5 minutes for jets and 2.5 minutes for turboprops, but a little under half the pilots indicated that they occasionally require the full 5 minutes allowed for in the operating procedures.
- Most pilots feel that sensors for identifying fluid failure would improve safety, but they indicated that the sensors must be accurate and reliable with no false warning, be used as an additional aid to visual checks, and should be used to give a *no go*, not a *go* situation.
- Most pilots indicated that their company publishes FAA approved Operations Specifications for their aircraft which allow takeoff in light freezing rain and/or freezing drizzle, but most are clearly very cautious and/or hesitant to takeoff in those conditions. Few pilots mentioned the risks associated with airborne icing when considering the HOTs available in freezing rain/drizzle conditions.

- Pilots feel that major improvements in safety would be achieved with remote deicing pads located near the end of the active runway and by having air traffic control coordinate the timing of deicing and takeoff. With the long holdover times offered by the new anti-icing fluids, all takeoffs could then be completed well within the HOTs.

Appendix A

Survey Questionnaire

*(Not available in electronic format/
Non disponible en format électronique)*

Sypher

*Risk Management of Aircraft Critical
Surface Inspection, Volume 3 of 3
Results of a Survey of U.S. Airline Pilots*

APPENDIX B

DETAILED RESULTS OF SURVEY

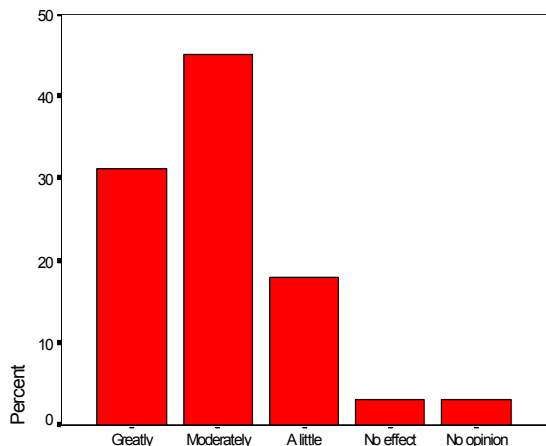
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A. GENERAL

A1. Do you feel changes over the last 5 years in de/anti-icing regulations and procedures have improved safety?



Effect on safety of changes over last 5 years

[Invalid responses: 19 (1%)]

Comments:

Greatly - 10 years ago ATC made it impossible to T/O with clean wings during snow at ORD because taxi times exceeded HOTs and they put you at the end of the line

Greatly - A clear cut policy of clean wing reduces some subjectivity of what is safe and what is not safe

Greatly - A much greater effort by ground personnel to assist us

Greatly - Acknowledgment of the problem most imp.

Greatly - Advent of Type IV significant advance

Greatly - Although I think we have gone over board on deicing we now deice when it's not needed

Greatly - Awareness of dangers from contamination

Greatly - Before that, the Captain was on his own in insisting that the airplane be clean

Greatly - Better fluids & more awareness

Greatly - Better fluids is biggest help

Greatly - Better fluids, faster deicing times, less time from deicing to takeoff

Greatly - Better fluids/off-gate procedures have improved safety immensely

Greatly - Better products more company awareness

Greatly - But have also created waste. Sometimes deicing is accomplished to satisfy FAR & I don't think it's necessary

Greatly - Clean a/c concept, better training, more off gate/pad deicing offer far better safety than several years ago

Greatly - Company policy is much better explained, takes the grey area away. It is now black or white leaning always to the conservative (safer) side

Greatly - Cut & dry decisions

Greatly - Deicing with Type II and Type IV = big improvement and LONGER holdover times

Greatly - Especially better procedures, company investment & support, travelling public understanding & expectations

Greatly - Especially clear HOT charts, new fluid types

Greatly - Especially the holdover time guidance

Greatly - Fluids and procedures have improves

Greatly - Gone to the side of too safe. Many deicings are unnecessary and cost the airlines a lot on money

Greatly - Good job ALPA

Greatly - Greater acceptance among companies and flight crew to err on the side of safety

Greatly - Greater crew awareness-much better ground procedures by ground crews

Greatly - Greater specific accountability on the applicators of deicing treatment & the PIC

Greatly - Having deicing equipment ready when and where we need it is wonderful

Greatly - High level corporate & FAA interest, expanded training & FHB improvements are significant

Greatly - Holdover times with "ranges" - different levels of precip vs temp-good!!

Greatly - Hub airports where there are long lines for takeoff should have deice personnel near the end of the runway for inspections and possible deice

Greatly - I feel safety has been improved, but the latest proc. regarding freezing rain has taken authority from the PIC, thus made the proc. inefficient

Greatly - I think the info & education & procedures have improved safety. Not sure if the "regs" really matter so much

Greatly - I think the procedures/rules do a great job for safety to the extent that I think we go beyond what is required

Greatly - I use the term "greatly" only as a comparison to what we had

Greatly - Improved fluids and procedures

Greatly - Improved fluids and the ability to get to the runway much faster after de/anti-icing

Greatly - Improved fluids, awareness

Greatly - In our NWA hubs we have more deicing trucks with Type IV fluids, plus great coordination with ground crews

Greatly - In some cases the procedures are too cumbersome, but overall awareness is greatly increased

Greatly - Increased holdover times assures safety

Greatly - Increased inspections, Type II & IV

Greatly - Increased training has improved pilot awareness

Greatly - It has made all of us much more aware of the dangers of ice on wings

Greatly - It is taken more seriously now

Greatly - It's nice to have a holdover time chart

Greatly - It's still difficult to see out of the cabin windows - especially with fluid dripping down

Greatly - Mainly the types of fluids allowing for greater holdover time. Also better training

Greatly - More at runway sights

Greatly - More awareness, better procedure and better fluids

- Greatly - More effort has been made to deice just before takeoff, off the gate, in a timely manner coordinated with rates of takeoffs
- Greatly - More pressure to error on the side of safety
- Greatly - Much improved fluids (Type IV, ultra, etc.)
- Greatly - Much improved fluids/holdover times
- Greatly - Much more efficient
- Greatly - Much more emphasis on ice checks plus review of accidents bring the requirements out vividly
- Greatly - New and improved anti-icing fluids
- Greatly - New fluids
- Greatly - New fluids & procedures have increased safety greatly
- Greatly - New fluids such as Type II & IV
- Greatly - New fluids with increased HOT and wing mounted lights specifically for viewing are a huge improvement
- Greatly - New fluids, better attitude from company about re-deice
- Greatly - New fluids, greater emphasis on clean a/c
- Greatly - Not at major carriers but very much so at regionals
- Greatly - Now there is no grey area, weather conditions within the parameter mean an inspection, union efforts means pax & company understand
- Greatly - Only been flying with airlines for 18 months
- Greatly - Our procedures have been given more direction! Clarify for the pilots use.
- Greatly - Pilots are more aware of icing hazards and the proper methods of deicing/anti-icing
- Greatly - Pre-taxi wing inspection plus new procedures have helped us all, say "let's get deiced" no question about it now
- Greatly - Primarily the introduction of the improved anti-icing fluid
- Greatly - Procedures - improved. Regs only force shoddy ops to conform
- Greatly - Procedures have taken the got-to-go now flight schedule to greatly needed conservative - we go when all is really positively ready and so there is no question of schedule integrity
- Greatly - Proliferation of close to runway de/anti-icing equipment; company's greater emphasis on 5 min prior to T/O inspections Type IV fluids
- Greatly - Recurrent training, off-gate deicing setups at departure runway end and off-gate deicing procedures have greatly increased safety
- Greatly - Regulations have become too restrictive. There is no longer any discretion allowed by the PIC
- Greatly - Remote deicing followed by immediate departures has become the norm. On gate deicing with long taxi during precip. was a joke - no more!
- Greatly - Remote deicing resulted in min time between deicing to takeoff, pre-deicing at gate at frost or wing & from inbound flight
- Greatly - Separate deice pads at airports like DIA seem very effective than maneuvering at a congested terminal area
- Greatly - Still a long way to go. Every airport need to have deicing next to or very close to departure end.
- Greatly - The development of Type II and subsequent fluids have significantly improved safety as have procedures expediting departure after deicing
- Greatly - The establishment of holdover times & the ability to delineate an example of time per condition-i.e. light/moderate/heavy gives a general rule of thumb for guidance
- Greatly - The fluids & procedures are better - but more to the point is a greater awareness and concern
- Greatly - The greatest improvement to safety has been in the commuter, regional, and smaller airline ranks. The majors, less
- Greatly - The longer holdover times have greatly improved safety
- Greatly - The new procedures have heightened awareness
- Greatly - The new regs and procedures have helped take some of the uncertainty and guesswork out of de/anti-icing
- Greatly - The use of Type II & IV fluids in conjunction with the holdover chart has taken a lot of the guesswork out of deicing
- Greatly - There is a new "standard" of safety that didn't exist
- Greatly - To the point of overkill. Remote deicing is THE way to go
- Greatly - To the point where now a significant percentage of flights needlessly deice. In my opinion perhaps 15-20% of total flights that deice did not really need to
- Greatly - Type II and IV are a giant ... in holdover times which helps considerably
- Greatly - Type II & IV fluids are improvement; printed holdover tables offer "concrete" guidance & support crew decisions; ground deicing crews seem much more knowledgeable; all last emphasis increased crew awareness
- Greatly - Type II, ultra fluids, gantry or end of runway anti/deice at PIT, DEN are excellent
- Greatly - Type II/IV usage plus more information on subject being made available raises crew awareness level
- Greatly - Type III & IV big improvement
- Greatly - Type IV
- Greatly - Type IV availability. More interest in airline training
- Greatly - Type IV deice fluid is very effective
- Greatly - Type IV fluid and less delay from deice to takeoff
- Greatly - Type IV fluid is a big development
- Greatly - Type IV fluid is great
- Greatly - Type IV fluid with its long holdover times has helped a lot!
- Greatly - Type IV greatly increases holdover time. Holdover time guidelines are useful
- Greatly - Type IV is a welcomed addition and improvement
- Greatly - Type IV is great
- Greatly - Type IV is great
- Greatly - Unfortunately accidents create better awareness
- Greatly - Wing sensors needed!
- Moderately - 2 step deicing methods; longer fluid holdover times; training received by ground personnel and pilots has been improved over the past 3 years
- Moderately - 4 years airline experience

- Moderately - 50% of improvements in operation. 50% of improvements for P.R. reasons only
- Moderately - A lot of unnecessary deicing is being one due to public fear as a result of several accidents involving icing
- Moderately - All the media hype & passenger fear cause most airline departs to stop when snow is falling
- Moderately - Anything to increase holdover time is helpful. Frequently the time from beginning of the last step till T/O is 20" or more. O'Hare is good example. Deice/anti-ice @ end of rwy is big help but not O'Hare
- Moderately - Awareness has been greatly improved
- Moderately - Awareness has improved safety, not necessarily the procedures
- Moderately - Awareness increased, tolerance for any ice decreased
- Moderately - Better equipment, streamlined procedures, improved training of ground personnel
- Moderately - Better fluid
- Moderately - Better fluids
- Moderately - By increasing awareness of potential aircraft performance problems and institutionalizing it in the airline system
- Moderately - Car wash style deice pads near runways should be standard
- Moderately - Changes are positive and very conservative which leads to safer conditions in icing conditions
- Moderately - Companies are giving their pilots a lot more latitude in this area
- Moderately - Company efforts vs Fed effort both
- Moderately - Crews now have solid guidelines to follow
- Moderately - De/anti-ice when # one for departure right at the runway
- Moderately - Deice pads near departure runways help tremendously
- Moderately - Deicing at the gate is not safe because the jetway blocks use of door 1L escape slide. Remote (near runway) deicing is best!
- Moderately - Deicing ground crews waste time and fluid. They need better training
- Moderately - Deicing requirements & procedures developed by company are almost too complex & are spread throughout several resource documents (ops manual/cockpit manuals)
- Moderately - Deicing too much sometimes, but most pilots hesitant to say so
- Moderately - Due to high employment turnover of ground personnel, many have not received much deice training
- Moderately - FAA mandated - Yes/airline implementation and oversight - no
- Moderately - Given more specific guidelines
- Moderately - Gone overboard
- Moderately - Greater awareness
- Moderately - Greatest improvement in area knowledge of SLD's
- Moderately - Have a way to go yet
- Moderately - I believe it has improved but also believe that visual inspections from inside aircraft are inadequate to determine conditions of wing
- Moderately - I believe the new regulations/procedures have achieved this moderate success largely because of an increase in awareness
- Moderately - I believe the previously good procedures have simply been enhanced
- Moderately - I believe there is some overkill in the existing system
- Moderately - I feel the deice crews are better educated & experienced. As well as advanced fluids (Type IV) and near runway deice pads
- Moderately - I have been a commercial airline pilot for three years. Type IV is great, but we need deicing pads by runways!
- Moderately - I only have been in an airline environment three years
- Moderately - I see more emphasis, especially at hubs, to establish deicing locations near the departure runways. Cuts down HOT
- Moderately - I still feel we need to reduce the time required to deice on a/c and/or move the deicing area much closer to the departure runway
- Moderately - I still think "car wash" style facilities at departure runway would be of greatest value - especially at "non-hub" airports
- Moderately - I still think there should be a "car wash" close to the runway, particularly at high density airports such as BOS, PHL, LGA, JFK, DCA, EWR, ORD
- Moderately - I would like to see some type of outside person do a visual inspection of the wings at the departure end of the runway #2 to depart
- Moderately - I'm not sure things are safer now, but an extraordinary amount of glycol has been sprayed in the last 5 years
- Moderately - If the new regulations were coupled with better TRAINING we could move into the "GREATLY" category
- Moderately - Improved fluids and more accurate start time reporting
- Moderately - Improvement due primarily to emphasis on proper procedure (as opposed to new technology)
- Moderately - Inconsistent deicing between airlines. Ex: flaps up instead of T/O flaps. Lack of common verbage between different vendors
- Moderately - Inspection procedures just prior to takeoff are still difficult and subjective
- Moderately - It's still not clear enough when the "clean wing" inspection must be done. The lighting on the wings isn't good enough either
- Moderately - Knowledge & procedural standardization have been much improved & advanced
- Moderately - Lag time still exists between deicing application and takeoff
- Moderately - Long departure delays after deicing still pose a problem
- Moderately - Main improvements: more advanced fluids
- Moderately - Mainly the advent of Type IV fluid
- Moderately - May have gone to conservative
- Moderately - More ATC awareness of getting a/c airborne quickly after deicings
- Moderately - More awareness
- Moderately - More awareness

- Moderately - More remote pad deicing is needed especially in the northeast
- Moderately - More standardized guidelines for holdover time and fluid improvements
- Moderately - Most crews were aware of ice dangers and took appropriate action. Now it seems deicing is done when not even necessary
- Moderately - Most of us were already deicing when it was necessary without any regulation
- Moderately - Mostly due to off gate deicing
- Moderately - Mostly with education and pilot awareness of the hazards
- Moderately - Much more attention has been given to the problem
- Moderately - New fluids are much better
- Moderately - New fluids seem to be effective for longer periods
- Moderately - New fluids with longer holdover times
- Moderately - New ultra fluid is great
- Moderately - Nothing can replace common sense
- Moderately - Off-gate deicing as in Denver, reducing takeoff delays improves safety most
- Moderately - Only due to deicing closer to takeoff time - we always did a good job of deicing
- Moderately - Only with airlines last 3 years. Prior experience was military
- Moderately - Pilot awareness I feel showed us to take more notice. Public awareness and fear of being violated for a lone snow flake has had a negative and costly effect
- Moderately - Pilots are more aware of holdover times and dangers associated with contaminated wings
- Moderately - Pilots are now "gun shy" and deice too often
- Moderately - Pilots were always very good at assessing whether their a/c need deicing. Newer procedures adding inspections by trained ground personnel add a bit more input
- Moderately - Primarily due to emphasis on HOT
- Moderately - Primarily in awareness & attention to problems associated with icing problem
- Moderately - Probably more so with the smaller airlines or commuters than my airline
- Moderately - Procedures not de/anti-icing regulations. More regulations by government just we are hands in situations that the regulations do not address
- Moderately - Regulation & procedure changes have helped compensate for lack of good judgment, but good piloting decisions are still the best line of defense in air safety
- Moderately - Regulations have induced awareness and have the effect of supplanting good judgment
- Moderately - Reinforcing that pilots decide about deicing
- Moderately - Remote deice - Great
- Moderately - Responsible pilots already had the necessary tools & knowledge if they chose to apply it, but there is no question that we now have better fluids as well as better trained ground personnel
- Moderately - Shorter time between deicing & takeoff
- Moderately - Should be like in Europe (i.e. PARIS) drive under car wash type deicing, then takeoff
- Moderately - Slick runways & ramps, environmental pollution & delays leading to haste moderate increased safety
- Moderately - Some improvement, also considerable quantity of wasted fluid and time for unnecessary deicing with new rules
- Moderately - Sometimes it's a little overkill (but to the side of safety)
- Moderately - Still need clarification of flight into ZL, ZR
- Moderately - Still room for improvement
- Moderately - Still should be done closer to departure
- Moderately - Type of fluid has helped the most. When and where we get deiced needs improvement
- Moderately - Technology, research, and education in awareness
- Moderately - The Air Florida accident (DCA) "woke" me up more than anything else
- Moderately - The change has increased awareness which is good-the wording leaves the pilot hanging should he decide to takeoff after HOT. No definitive guidance on whether HOT is really accurate or not
- Moderately - The clean aircraft concept has helped
- Moderately - The greatest benefit has been development of better fluids
- Moderately - The guidelines and procedures are helpful
- Moderately - The inclusion of Type II fluid has added safety at our hub airport, but our outstations still use only Type I fluid-because of cost. Safety should be paramount regardless if you're at an outstation
- Moderately - The increased emphasis & education has helped the most
- Moderately - The old way worked just fine if the Feds could get you from the gate to in the air in a reasonable time
- Moderately - The regulations have not but training & recognition have improved safety
- Moderately - The safest approach is to deice just prior to takeoff
- Moderately - There are times we deice in adherence to rules even though common sense (pilot judgment) may dictate otherwise
- Moderately - There are times when deicing is a bad idea. Example - 10 degree below zero - blowing snow-after deice snow now sticks - before deice it did not
- Moderately - There is always room to improve I think more training, at least at my airline, should be implemented in-house to better explain deicing procedures
- Moderately - Those I flew with were well aware of icing hazards as a rule - but I felt that the subject didn't get enough emphasis or support
- Moderately - Type II and Type IV anti-icing fluids have been the biggest improvement
- Moderately - Type II fluid
- Moderately - Type II fluid esp. a big improvement over Type I
- Moderately - Type IV & remote - before T/O deicing engines running
- Moderately - Type IV ultra
- Moderately - Unnecessarily resulted in more deicing of a/c at the expense of schedule adherence
- Moderately - Visual check of wing is not very effective. Can't see much and seems to be more for "show"
- Moderately - We didn't have a lot of problem with ice - I just get the aircraft clean

- Moderately - We have gone to such extreme that it must be an improvement
- Moderately - We have heightened awareness of snow & ice removal
- Moderately - We need to deice at the departure and end of the runway
- Moderately - What it really did was force those who did not deice to stop & think and those who did deice it gave us a bit of support & better technology
- Moderately - With the regulations and deicing/anti-ice fluids I feel they have come a long way
- Moderately - Yes, almost to the point of excess. Deicing at times when I felt it was not necessary
- Moderately - Yes, we have come a long way since Air Florida in the Potomac, no question. Still, icing seems nearly illusive as windshear with all our doppler knowledge
- A little - 2 years civil exposure - 26 years military
- A little - 4.5 years in airline environment. Post-check is important due to lack of visibility from inside aircraft
- A little - A lot of fluid type improvements; still need departure end runway verification
- A little - A lot of overkill occurs. Captain's authority has been taken away
- A little - A regulatory nightmare
- A little - ATC seems more aware and controls flow off gate or deice pad to minimize time to T/O
- A little - Actual on line experience by new crews is still missing. You can't regulate experience levels
- A little - Airplanes & weather have been around for almost 100 years! Has improved, but there is still too much variation in conditions to say any procedure is effective
- A little - Another FAA band-aid fix. Until we are allowed to anti-ice at the departure end 5-10 min prior to T.O. accidents will occur
- A little - Awareness and training are more effective than regulations
- A little - Basically no change. Huge cost increase
- A little - Better fluids
- A little - But still seeing engine damages from ice off MD80 wings on takeoff
- A little - But they have gone overboard
- A little - By the time I takeoff holdover times are exceeded
- A little - CA is still the one who determines safety
- A little - Can't tell if new procedures are being followed - not sure about training of ground personnel
- A little - Careful and aware pilots really didn't have much to worry about in the first place
- A little - Communication with the deicing coordinator, remote deicing availability, and engine-runway deicing have helped. Shortening the time between deicing/anti-icing is greatest safety factor
- A little - Crashes were not common prior to changes, a lot has been done to stamp out the last 0.1%
- A little - Deicing is still performed at the gate instead of the runway except for DIA (Denver). Improved fluids are the only improvement
- A little - Different type
- A little - End of runway deicing, the best defense against icing, is still rarely used, especially at regionals. The airline management, in effect, play lip service to the FAA icing guidelines
- A little - Everyone is conscious of the need to takeoff shortly after being deiced
- A little - FAA does a lot of rulemaking for show. They like to show airlines/travelling public that they are enhancing safety vs really doing something about the real problem. Icing is a prime example
- A little - Fluids are better
- A little - Flying only 2 years
- A little - Gone way too far overboard
- A little - Ground crews respond to more formal procedures
- A little - HOT seems to be unrealistic in many cases FAA needs to encourage airports to have DRIVE THROUGH
- A little - Have only been flying in an area of the country that gets icing conditions for the past two years
- A little - I believe there should be a procedure for all a/c just prior to taking the runway e.g. an independent that deices and charges per/and/type a/c
- A little - I believe we are now overkilling the subject
- A little - I kind of think we've gone to overkill
- A little - I never noticed a decrease in icing incidents since new procedures have been in effect
- A little - I think the major airlines have always emphasized the use of/awareness of de/anti-icing. Gains probably greatest in smaller/regional airlines
- A little - I think we have wasted a lot of deicing fluid when the risk was minimal e.g. dry snow low OAT
- A little - I wonder if we've gone overboard slightly. It seems that we're deicing unnecessarily more often
- A little - In the 3 years I have been flying for an airline nothing seems to have really change
- A little - Industry has paid clearly for the gross incompetence and indiscretions of a very few
- A little - It's forced pilots to a "dammed it you don't" attitude even if you think it's unnecessary
- A little - Lost a close friend in American Eagle FLT 4184 due to bad aircraft design
- A little - May have forced those that wouldn't have previously to have a/c sprayed/sprayed again
- A little - More car wash operations at runway
- A little - Most professional airmen have always been conscientious in this regard, the record speaks for itself
- A little - Most regulation is window-dressing to ensure that no matter what happens, it's the pilot's fault
- A little - Mostly attitude and awareness have improved safety-not procedural changes. Attitude & awareness on behalf of airlines predominantly based in southern dry climates
- A little - Need deicing at end of runway
- A little - Need to be simpler and more streamlined
- A little - New deice fluids are better - more regs and rules are not!!
- A little - Now unnecessary delays are taken because of the inability to interpret what is seen
- A little - Only been exposed for 3 years and our particular airlines ramp agents are not trained well
- A little - Only by making pilots more aware

- A little - Only pilots/operators with little or no previous exposure to icing conditions/winter operations would benefit from new regulations
- A little - Other than company led education on icing buildup and effects. There have not been any more safety built in spread
- A little - Other than the new fluid nothing has changed. Once holdover time is exceeded it's still the pilot's call
- A little - Our procedures were adequate prior to the FAA implementation of new rules
- A little - Overdone
- A little - Paranoia around adhering to the regs. results in wasted fluid and time in unthreatening conditions
- A little - Personally I am still operating within the same safety limits as before. It just takes a little common sense
- A little - Pilots still will knowingly takeoff with snow or frost on wings to save money and avoid losing a slot time; that's the weak link
- A little - Procedures are more CYA than effective - Holdover times cannot reasonably be met
- A little - Regs have been directed more at threatening pilots rather than at developing more effective procedures
- A little - Regulation required airlines to provide guidelines
- A little - Rules have changed to more clearly define terms and conditions
- A little - Safe facilities were always available and I prefer to make my own determinations rather than relying on a marginally trained, unlicensed ground ponder
- A little - Safety was never a problem in my operation. Now we are forced into "overkill" - and a waste of money
- A little - Short holdover times are unrealistic & economically unsound
- A little - Since a visual check is the only legal/safe procedure for takeoff, the holdover charts are of very little value
- A little - Since the Air Florida accident we absolutely overkill deicing
- A little - Some changes are more "look like we're doing something" than actual safety improvements
- A little - The FAA basically fixed a non-problem considering accidents among the major carriers seemed to occur only on non-leading edge slat (DC-9-10/F-28) aircraft
- A little - The deicing process has not changed much but the addition of Type II & IV fluid has lengthened holdover times
- A little - The mandatory anti/deice criteria should be tightened by at least 200%
- A little - There still seems to be confusion at our company regarding the "clean a/c" concept-critical surfaces only vs ENTIRE a/c. Even our manuals have discrepancies on this topic
- A little - They have made people more aware and have therefore increased safety. I don't think my carriers' level of safety is substantially better
- A little - Too many rules
- A little - Type II and ultra Type IV have been improvements but deicing needs to be done at the runway
- A little - Using trained ramp personnel to do upper wing ice inspections has sometimes appeared to be too conservative-They tend to error on the conservative side and some of our deicing is not needed
- A little - We have improved safety a VERY small amount at a great cost in time & money
- A little - We have lost the "common sense" approach to handling deicing
- A little - We've gone way overboard!
- A little - What about inflight icing with pneumatic boots on Hershey Bar wings ALA ATR-42 & supercooled water droplets causing run-back icing behind boot?
- A little - While newer fluids have increased holdover times, there is still no widespread availability of pre-takeoff contamination checks near runway
- No effect - 5 years ago-we would takeoff after making sure a/c was free of ice & snow. Common sense!!
- No effect - Accidents requiring new regs could have been avoided by using (US Air) better judgment. Now we are deicing unnecessarily by a great deal of the time. ANOTHER FAA-KNEE-JERK RE ACTION
- No effect - Added unnecessary deicing/time and cost to the operation - very costly with a cold airplane and light snow that does not stick
- No effect - Better awareness being taught to flight crews
- No effect - Deicing was never the big problem it was made out to be, only scabs and inexperienced pilots had problems
- No effect - FAA takes "band-aid" approach to issue. FAA is reactionary. Airlines do the least possible - to save \$\$
- No effect - Holdover tables are useful, but other procedures seem to be designed more to appease the public & lawyers than to provide any true safety improvement
- No effect - I think statistics bear this out
- No effect - In spite of increased paper & training costs, pilots decision to deice and T/O or deice again are based on same info. available. Short-lived attempt to have GSA's make decision was detriment
- No effect - It was never not completely safe. Just more over regulation due to a couple people's mistakes
- No effect - Made people aware
- No effect - Most changes have been a "CYA" - so the lawyers can say - "We have these procedures..."
- No effect - My airline does not do much of anything differently than before except the wing inspection prior to takeoff if precip is still falling, and if it is dark outside you cannot see anything anyway
- No effect - No real changes have been made. I feel FAA just made a lot of commotion to please the flying public. I feel that pilots did deice accordingly
- No effect - On the plus side, most pilots (if not all) takeoff with contaminated wings-however, sometimes it seems like if there are 3 snowflakes falling from sky, deicing crews demands re-deicing
- No effect - Regulations only further the profits of limited special interest groups
- No effect - Regulations seem to be typical "cover your rear end" measures
- No effect - There has been a tremendous over-reaction to snow/ice on wing surface
- No effect - Walking back into cabin and viewing wings and flaps do little, to check for contamination as deicing

fluid greatly hinders visibility-have inspectors at departure end of runway to check from outside

No effect - When you finally get through the maze of new procedures, you still inspect the wing just like we always did and base the T/O decision on that. The new procedures are a waste of time

No opinion - 3.5 years airline experience - not much notice of changes

No opinion - Before the last 2 years, I flew in SoCal. I have no reference to the changes

No opinion - Deiced twice in 8 years

No opinion - Employed with airlines for the previous 3 years - no change noticed

No opinion - Have only been with commercial carrier for 3 years. Procedures seem to be good

No opinion - Have only been with regional 2 years

No opinion - Haven't been de/anti-icing for the last 5 years

No opinion - Haven't been in the industry long enough to have formed an opinion

No opinion - Haven't been operating under FAA procedures that long - ex-military

No opinion - I have been an air carrier pilot for less than five years

No opinion - I have only been flying in this environment for 2 years

No opinion - I have only worked in the airline industry during the past 4 years

No opinion - I haven't noticed

No opinion - I was military prior to this airline job 1 1/2 years ago

No opinion - I'm a new hire

No opinion - I've only been an airline transport pilot for the past 2 years

No opinion - I've only been flying airlines for 2 years

No opinion - I've only been flying for an airline for a year

No opinion - New to commercial aviation

No opinion - Not been exposed at least 5 years

No opinion - Only at UAL 2 years

No opinion - Only been airline pilot 2 years

No opinion - Only been exposed to these types of conditions for 3 years - not aware of any significant changes

No opinion - Only been in industry 3 years

No opinion - Only hired 2 years ago

No opinion - Only in industry for 3 years

No opinion - Only operated in icing conditions in past 2 years

No opinion - What changes?

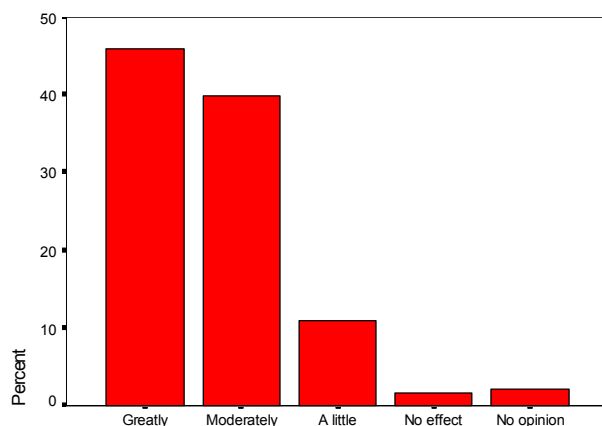
No opinion - With PART 121 operation only 2 years

Inv. resp. - Only employed for 1 1/2 year

Inv. resp. - Only flown for 2 years with civilian airline

Inv. resp. - Raised conscientiousness & knowledge

A2. Do you feel that the wider availability and use of Type II and Type IV fluids have improved safety?



Effect of wider availability and use of Type II & IV fluids on safety

[Invalid responses: 18 (1%)]

Comments:

Greatly - "Anti-ice" properties after "deicing" have improved safety during periods of freezing/frozen precipitation

Greatly - Anything that prevents re-accumulation without affecting aerodynamics of lifting surfaces is great

Greatly - Better fluids is biggest help

Greatly - Better protection

Greatly - Better protection with Type IV

Greatly - Big difference

Greatly - Both these fluids are far more effective and seem to retain their effectiveness as advertised

Greatly - But these fluids are not easy to come by

Greatly - Due to extended HOT's

Greatly - Due to extended hold over times

Greatly - Especially Type IV

Greatly - Especially Type IV

Greatly - Especially when types II and IV are used when there is a question as to Type I holdover limits. Sometimes deicers are hesitant to spray if they don't think necessary

Greatly - For airports that don't have end of runway deicing (i.e. ORD) Type IV seems to be the only way to go

Greatly - From my limited experience

Greatly - Great stuff

Greatly - Greater holdover time

Greatly - Holdover time improvement

Greatly - Holdover time was historically our biggest problem

Greatly - Holdover times with Type I were too short & unrealistic. Type II & IV are vastly superior to Type I in this respect

Greatly - However to all stations provide it thus maximum safety is compromised by not only having Type I when it is snowing

Greatly - I find holdover times to be particularly useful

Greatly - IV fluids seem much better

Greatly - Increase times

Greatly - Increased holdover times are valuable

Greatly - Increased holdover times assures safety

- Greatly - Increased holdover times have increased user (pilot) confidence
- Greatly - Increases holdover time greatly and allows the pilots a better safety margin
- Greatly - Increases time between deicing and when you would have to return to gate
- Greatly - It's great to see Type IV fluids being used
- Greatly - Long holdover times
- Greatly - Longer holdover is critical because of slowdowns during winter ops
- Greatly - Longer holdover time
- Greatly - Longer holdover times are a must. Type I not sufficient
- Greatly - Longer holdover times are the biggest improvement
- Greatly - Longer holdover times enhance operational flexibility
- Greatly - Longer holdover times improve operations as well as safety
- Greatly - Longer holdover times make me feel more confident
- Greatly - Much improved holdover times
- Greatly - Need holdover times!
- Greatly - Need more access to Type IV
- Greatly - Now we can takeoff just as we did before only this time with real protection in snow storms so people can bitch about a late flight instead of a canceled flight
- Greatly - Octagon Type IV great improvement especially in light freezing precip
- Greatly - Of course
- Greatly - Our airline only has Type IV at hubs, not at outstations. This is a problem
- Greatly - Particularly Type IV
- Greatly - Type IV availability. More interest in airline training
- Greatly - Some stations try to push Type I for cost-savings
- Have to ensure Type II/IV usage
- Greatly - Still ridiculous that Type I is only available fluid at some locations
- Greatly - Technology and availability has gotten better & better
- Greatly - Technology has been a major improvement
- Greatly - The biggest safety improvement is due to the reduced stress on the entire operation due to longer holdover times
- Greatly - The increase in holdover times helps tremendously at busy airports
- Greatly - The long holdover for Type IV is a great plus
- Greatly - The past year, I have only used Type IV, and have never seen it breakdown
- Greatly - The problem is, though, at many hub airports only Type I is available
- Greatly - These fluids provide much better holdover times at busy airports where ATC delays after gate deicing would previously necessitate return to gate for additional deice
- Greatly - They seem to offer better protection for a longer period of time, but the only real method to ensure a safe departure is to look at wings
- Greatly - They should be more available
- Greatly - This was a great step forward, however availability at small stations still a problem
- Greatly - Type I fluids time of usefulness was worthless unless you were at the end of the runway and they deiced you in 2 minutes
- Greatly - Type II & IV - fabulous invention
- Greatly - Type II should be the standard to allow for more holdover time
- Greatly - Type IV excellent
- Greatly - Type IV has greatly improved HOT and, thus, confidence in deicing programs
- Greatly - Type IV has taken a lot of the pressure off in the decision-making process by allowing a longer HOT
- Greatly - Type IV is a great improvement!
- Greatly - Type IV is great
- Greatly - Type IV is great stuff
- Greatly - Type IV's increased capacity is a great comfort
- Greatly - Type IV/ultra fluid is the beset cold. Weather innovation since carburetor heat
- Greatly - Using Type II & IV has allowed me to feel comfortable about the status of my a/c prior to taking the runway, especially as it relates to FZDZ, FZDZ, FZRA
- Greatly - We just started using Type II & IV a year ago
- Greatly - Wider use and longer holdover times available
- Greatly - Wing sensors needed!
- Greatly - With busier overcrowded airports, the longer holdover times are a definite plus
- Greatly - With taxi times today, YES!!
- Greatly - Yes I do! I know it has. I watch other aircraft ahead of me (taxiing) and can see the fluid on their wings
- Moderately - Allows more flexibility due to extended holdover times
- Moderately - Based on information written about improvements in these fluids. They also seem to have greater holdover times
- Moderately - Better time for holdover
- Moderately - But the fluids are so thick that it makes it almost unsafe to taxi & see out of the windows
- Moderately - Due to longer "HOT"
- Moderately - Especially Type IV
- Moderately - Greatly improved HOT's as well as complacency
- Moderately - HOT too short with just Type I
- Moderately - Have not used enough to know for sure
- Moderately - Have not used Type IV
- Moderately - Holdover times are more realistic. 15 min with Type I is a joke with today's congestion
- Moderately - Holdover times longer
- Moderately - Holdover times with Type IV allow a timely departure from most large airports without having to repeat the deicing procedure
- Moderately - I feel most comfortable with the thicker agent giving the most holdover
- Moderately - I think some pilots are relying too much on the deicing capabilities at airports & aren't doing visual checks prior to T/O
- Moderately - I think they have also increased the potential for complacency
- Moderately - In the obvious bad conditions, these types give us a workable carry over

- Moderately - Increased safety margin from longer holdover times
- Moderately - It has helped because holdover times are longer and we don't have to deice a second time as often
- Moderately - It's a definite help for anti-icing protection
- Moderately - Longer HOT are beneficial as most airports today are overcrowded-especially with inclement weather and so it's often difficult to start engines, taxi out, shut engines down, deice, start engine again & T/O
- Moderately - Longer holdover time helps a lot
- Moderately - Longer holdover times but not used very often
- Moderately - Longer holdover times improve operational reliability more than safety
- Moderately - Longer holdover times with Type II & IV are the main reasons for improved safety
- Moderately - More effective than previous types
- Moderately - Need accurate info for new fluids without confusion of multiple HOT
- Moderately - Need to be available everywhere, or deiced at takeoff point
- Moderately - Nice to have when needed
- Moderately - Not sure if it is the type fluid or just greater awareness
- Moderately - Off-gate deicing & no delays getting to rwy when gate deiced
- Moderately - Problem at one of our hubs is only getting Type I unless have to return to gate (then we can get Type II-company does NOT allow Type II initially, even if, in crew's judgment, we need it)
- Moderately - Rarely used Type II/IV
- Moderately - Seem to stay on wing longer
- Moderately - So expensive they are rarely used
- Moderately - So we're told. We still depend on human judgment to know if we're safe though
- Moderately - Still get Type I half the time
- Moderately - The Research & Improvement in fluids is more effective than the overdone spraying & inspecting
- Moderately - The bottom line & final defense is the pilot's professionalism
- Moderately - The fluid type isn't the key. It's the short taxi times
- Moderately - The fluids are great, but without more training in order to save money/time people still use Type I in the WRONG situations!
- Moderately - The thicker, absorbing qualities of new fluids increase holdover times, but obviously not a cure-all
- Moderately - There are times you need Type II
- Moderately - These fluids are better and have longer holdover
- Moderately - They last a little longer
- Moderately - Type II & IV fluids have given operators flexibility to maintain operations during ground icing conditions
- Moderately - Type II fluid moderately, Type IV greatly
- Moderately - Type IV has a much longer holdover time
- Moderately - Ultra is wonderful stuff - nice and slimy, long holdover, good taxi-speed shear off resistance)
- Moderately - Until this year I did not see wider availability
- Moderately - Used Type IV once/this year when holdover expiration was a problem
- Moderately - Usually we only get Type I
- Moderately - When we don't run out
- Moderately - When we have needed to deice frequently the conditions call for the extended holdover times
- Moderately - Wider availability does not help when your operator will not supply nor use these fluids
- Moderately - With the present system this area is the most important to show improvement in technology
- Moderately - Would like to see more locations with Type IV
- Moderately - Would like to view a real life demonstration of Type II to instill my confidence in it
- Moderately - Yes, longer holdover times
- A little - At the regional level. Type II & IV has only been available at the major hub airport. The outstations only have Type I available
- A little - Does give me longer holdover time but not much safer
- A little - Don't fully understand them
- A little - Fluids are better
- A little - Hard to tell - I've only read about it - No video or training or direct experience, like applying or touching it
- A little - Have never used Type II or Type IV fluids
- A little - Haven't seen Type IV yet
- A little - Holdover times & great variations in weather, during any given situation, still dictate the need to spray off aircraft when #1 or #2 for takeoff.. to be sure
- A little - I am not convinced of the holdover time ranges especially during heavy or moderate snow
- A little - I work for a charter airline and really don't find it easily available
- A little - Improved the operation i.e. not having to return for more deicing as often
- A little - Improvement due primarily to emphasis on proper procedure (as opposed to new technology)
- A little - It would improve safety and completion if it were available at the outstations that truly need it
- A little - My airline uses Type II. Possibly due to cost of fluid and/or equipment (Type I and Type II trucks)
- A little - Not always available when I need them
- A little - Often not available
- A little - Often Type II or IV is not available due to cost
- A little - Once again it's not the fluid but how and when the fluid is employed that counts
- A little - Only in heavy precip
- A little - Only Type I available at most stations other than hub stations
- A little - Our company rarely uses Type II or IV ever though we receive training on their use
- A little - Safe facilities were always available and I prefer to make my own determinations rather than relying on a marginally-trained, unlicensed ground ponder
- A little - Safety is a function of the conscientiousness of the flight crew not the type of fluid
- A little - The bottom line is a clean airframe. Most accidents in winter ops dealt with more than dirty airframe i.e. No heat flaps up etc.
- A little - The same effects can be achieved by deicing with Type I fluid just before T/O

A little - These fluids are superior. But timely application (close to takeoff) is more important

A little - They don't necessarily improve safety as much as they improve efficiency - getting off the ground after initial deice

A little - They just give us more time to off the ground - with Type I, sometimes WR couldn't even make it to the runway

No effect - I never had a problem with Type I

No effect - I work for a regional carrier and we only have Type II/IV in our hub airport

No effect - It hasn't raised safety level but it has greatly enhanced my flexibility from application to the end of the runway

No effect - It may improve HOT. But if my a/c is accumulating ice or snow I go back & get deiced again

No effect - Just made it more convenient to T/O with longer holdover times

No effect - My company is too cheap to use them

No effect - TWA is too cheap to use Type II

No effect - They are all effective when used properly. Basically holdover times have not been a problem for me

No effect - They have added cost and complexity though

No effect - Type II & IV fluids are not readily available at my airline

No opinion - 99% of the time we use Type I 50/50

No opinion - Have not seen Type IV fluids

No opinion - Have not used hi-viscosity fluids

No opinion - Have not used Type II or IV yet

No opinion - Haven't been in the industry long enough to have formed an opinion

No opinion - Haven't seen them used yet

No opinion - I have no basis of comparison

No opinion - I use Type IV and enjoy the increased holdover times.

No opinion - I was military prior to this airline job 1 1/2 years ago

No opinion - In my company I have only had occasion to use Type I fluid

No opinion - My company only uses Type I

No opinion - My employer does not use Type II

No opinion - Never used them

No opinion - Only used Type II once

No opinion - Our airline only uses Type I

No opinion - Unable to comment; can't recall a flight where it (II, IV) was used; (typically Type I)

No opinion - We use Type I fluid only

Inv. resp. - Don't know

Inv. resp. - Don't know if it has improved or not

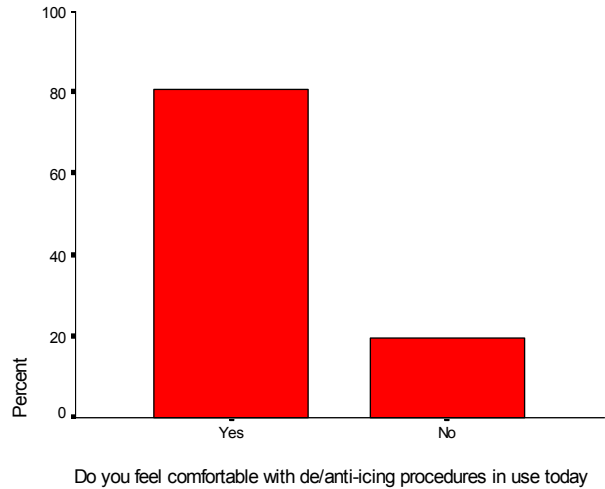
Inv. resp. - Have only been sprayed with type I

Inv. resp. - It may be available but our outstations don't have it & this causes many delays

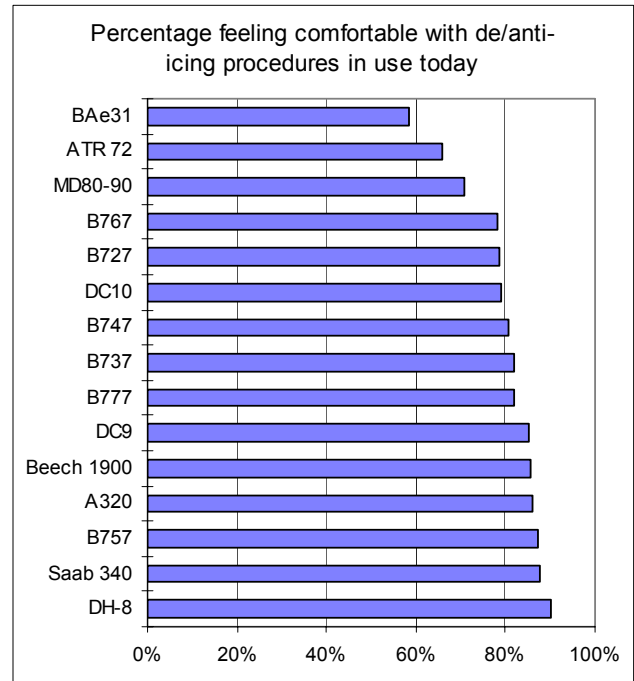
Inv. resp. - My company is approved to use Type II and Type IV but checks not to, I believe it is due to the expense

Inv. resp. - Not enough exposure to the different types

A3. Do you feel comfortable with the de/anti-icing procedures in use today?



[Invalid responses: 36 (2%)]



Comments made to prompt: If no, please explain:

Yes - 99% comfortable, I would much rather deice at the runway departure end to ensure the safe 100% comfort feeling

Yes - Again, I feel the problem is more in understanding the icing environment better. Only then can we know what is needed to fix it

Yes - Although they vary from hubs, where I feel quite comfortable, to outlying stations, where sometimes I'm not so comfortable

- Yes - Always room for improvement though. Best systems have deicing done near runway end - very little delay to takeoff
- Yes - As long as the deicing is completed and takeoff is assured within the holdover times
- Yes - As long as time restraints of fluids are adhered to
- Yes - As long as we can depart immediately, it works fine
- Yes - At most airports, some are still cumbersome, good PIT-DIA
- Yes - Because it has to be done
- Yes - But I still depend on my own best judgment and not the ground personnel
- Yes - But the deice area should be as close to active runway as possible
- Yes - But the requirement to visually inspect the wing JUST prior to T/O often through obscured windows further delays time to T/O and often is not very effective
- Yes - But they are used too much when there is only a very small amount of precipitation falling - one snowflake and everyone goes to the deicing pad
- Yes - But think airport improvements for future need more availability for end of runway de/anti-icing instead of at gate
- Yes - But with our program, it's also sometimes difficult to explain to ground crews that we need deicing. They say, "but flight xxx was fine without deicing. Why are you different?"
- Yes - But would be better with end of runway anti-ice
- Yes - But, I think procedures have become overly restrictive and too inflexible; i.e. sometimes we deice when we don't have to based on flight crew assessment
- Yes - But, is overkill
- Yes - But, should be able to speed up process
- Yes - But, the best improvement can be in the access to runway. i.e. shoot us off right at the departure end
- Yes - Company procedures require trusting someone making little more than minimum wage
- Yes - Effort to deice all aircraft near the departure end of the runways should be addressed in the construction of new airports i.e. Denver Int.
- Yes - Except for freezing rain - I haven't had any falling when I've decide to go fly
- Yes - Except for visual check of wing
- Yes - Except if I decide I do not need to deice I'm almost forced to do it anyway
- Yes - Except slow and wasteful
- Yes - Feel we are all deicing way too much-wasting lot of time & money. FAA has mandated that you almost always deice & pilots don't want violation so they deice often when it's not required. Am for safety
- Yes - Generally I like the procedures however I would like to see more offgate deicing near the departure end of the runway
- Yes - Generally, yes. I still think there should be a "car wash" with outside inspectors & proper lighting. Cabin window with a/c lighting is limited
- Yes - Ground crews at many of my company's stations are poorly trained in company procedures and crew confidence in their ability to judge a/c condition is poor
- Yes - However - final decision to deice or not should always belong to Captain
- Yes - However inspecting the wings from the cabin is basically of no value especially at night
- Yes - However, I always get deiced if in doubt, perhaps even when not necessary due to inability to see wings/tail
- Yes - However, I think it has gone overboard. I have seen perfectly clean airplanes in the line to deice
- Yes - However, at my company, if at anytime after HOT expires, pre-T/O contam. check can be done and a/c can depart. Regardless of these new proc., ultimate responsibility still rests with crew
- Yes - However, the airline I work for has an increasing procedure this year! Ground personnel determine if you need deicing, then if you do, they ask you which type of fluid we would like??!!
- Yes - However, the rules and the way they are interpreted and applied could be less a cumbersome task. Pilots would also like to think of the whole operation. and not just these long procedures
- Yes - I felt comfortable before!
- Yes - However- some remote/smaller station ground crews need continued supervision & experience
- Yes - However, it is still difficult to visually check the wing properly at night through cabin windows, due to glare from both inside & outside the cabin & often scratched plastic windows, fluid, lack of light
- Yes - I am not comfortable with airports that utilize deicing/anti-icing at the gate and then after leaving gate, there is a strong possibility that an extended period will pass prior to T/O clearance
- Yes - I believe there is still too much delay prior to takeoff at some airports (i.e. ORD with gate deicing) Should be looking at setting up pad closer to departure rwy like DEN
- Yes - I don't like non-flying ground crews telling I need/do not need deicing
- Yes - I have to trust the deicing crew - their visual inspection & training - keep their training first rate
- Yes - I pay very close attention at stations that are staffed by our affiliate major airline-they are often not as experienced in properly deicing the turboprops we fly
- Yes - I still wish we could reduce the time from deice to T/O at some airports
- Yes - I think our system at our airline works great. I've never taken off in questionable conditions of the aircraft
- Yes - I wish there were better procedures to allow depart during FZ drizzle & light FZ rain. Our manual allows for a range of time for HOT to elapse (ex. If FZ rain-2-5min) I guess that's good for lawsuits
- Yes - I would like to see deicing pads near the runways at hub airports
- Yes - I would prefer a two to three day ground school (Extensive) on just deicing/icing procedures
- Yes - I'd feel much more comfortable if ALL airports used deicing pads adjacent to T/O runway, to deice/anti-ice just prior to T/O instead of on-gate deicing followed by lengthy taxi
- Yes - I'm very comfortable because we've gone "the other way" & I think we now have overkill on the deicing

- procedures. Who is going to recommend LESS deicing? No one, probably
- Yes - If in doubt spray!
- Yes - If there are enough trained people at the station to deice the a/c
- Yes - Improvement would include deicing at the runway
- Yes - In heavy precipitation conditions it would be nice to having deicing equipment located near the runway
- Yes - In many cases it's "massive overkill" but that's better than not addressing the problem at all
- Yes - It is EXTREMELY subjective for me to look out of a crazed, scratched, probably partially fluid-covered window in the cabin at night with flaring lights, or in almost total darkness for fluid failure
- Yes - It would be even better if there were deice pads nearer the runway than doing it at the gate. Too much hold time lost in taxi out.
- Yes - It's a qualified "Yes". My greatest comfort level is when I can takeoff immediately after de/anti-icing
- Yes - Maybe overly restrictive by each airline
- Yes - More effort should be made to have deice capability closer to departure runway. Too many airports have numerous obstacles to clear before an a/c can even get to departure end of rwy. Often I have seen holdover times exceeded in what is just normal taxi time at various airports
- Yes - More errors on the side of safety
- Yes - Mostly I'm not sure we can properly evaluate the contamination on a wing from inside the airplane
- Yes - Much more comfortable when a/c is deiced at a remote pad just prior to takeoff vs at gate
- Yes - Need longer holdovers! and drive-through end of runway deicing
- Yes - Note-holdover time can be greatly impacted however based on conditions and number of deicing trucks avail. Deicing areas at departure ends of runways would significantly improve safety
- Yes - Often gross overkill
- Yes - Only bad thing is as mentioned in opening - hard to see through windows covered with fluid
- Yes - Overall yes when common sense is added to the equation
- Yes - Overkill
- Yes - Procedures in effect are safe, but monitoring of implementation of procedures by GROUND crew is often lacking
- Yes - Procedures, especially offgate remote pad, raise the work load because of lack of standardization
- Yes - Right how a lot of what happens is over reaction
- Yes - See above comment (I think some pilots are relying too much on the deicing capabilities at airports & aren't doing visual checks prior to T/O)
- Yes - Some off-line station deicing personnel need more training
- Yes - Some times too much time passes between deice and T/O
- Yes - Sometimes too slow in application
- Yes - Still too much time between application of fluid and takeoff
- Yes - The FAA needs to provide or financially assist in the procurement of deicing pads such as Denver at major airports!
- Yes - The advent of remote deicing, close to the departure runway (in terms of time) has been as much of a breakthrough as the introduction of Type II & IV fluids
- Yes - The deicing procedures are, it's trying to factor in the ATC delay in getting to the runway that's a major inhibitor to departing in icing conditions
- Yes - The ice pad could be closer to active runway at some cold WX airports - you push holdover times with long taxi
- Yes - There is room for improvement. Surface detectors or a tactile inspection just prior to T/O would really help confidence
- Yes - Totally
- Yes - Viewing the upper wing surface from the cabin is a joke. There is no way you can adequately view the wing for contamination (especially at night) from inside the cabin and view the entire wing surface
- Yes - We are deiced very close to takeoff fine. We haven't had to sit around afterwards
- Yes - We don't takeoff unless we are contamination-free. Holdover times are so short they practically don't apply
- Yes - Wing sensors needed!
- Yes - Wish - all could be engines running
- Yes - With some variation from hub to outstation - procedures are good
- Yes - Would be nice to have deice truck at hold-short area for quick squirt if you're unsure just prior to T/O. Sometimes pilots don't want to go back to gate or deice pad and delay departure any longer
- Yes - Would like to see more deice close to runway
- Yes - Would prefer to do deicing near end of departure runway when approximating #1
- Yes - Yes, but could be improved in high wing aircraft, or night operations when precip is falling
- Yes - Yes, but it is even more important now not to become complacent, and count on the deicing personnel doing their job. Double check!
- No - A pilot must rely on the ground crew doing a good job, since deicing cannot be verified from the cockpit, i.e. tail, fuselage, etc.
- No - A taxi thru system just prior to runway entry, with a recovery system for recycling fluids, would be the safest and most efficient
- No - A valid surface inspection from inside the airplane is impossible
- No - A visual inspection from the cockpit or cabin for anything but white snow is useless. Also it depends on light - day, OK. Night, depends on how much ground light is available
- No - Again at the regional level, while deice procedures & application are good. At the outstations it remains as good as the ramp personnel are trained, usually poor
- No - Airport authority deicing such as used in Europe. Should be deiced just prior to T/O. Holdover times and precipitation rates are very difficult to estimate
- No - Airports need to maintain constant & equal ways of applying fluid i.e. deice all a/c at end of runway in use at every airport not just at some
- No - Airports should be responsible for placement (close to runways) & capacity (to match takeoff capacity of

- airport). Would also allow reduction of waste by recycling at a permanent facility
- No - Airports with long taxi routes and takeoff delays need end of runway deicing
- No - All the onus is on the flight crew, with little help except the emphasized responsibility
- No - Although the procedures are effective in removing ice the pre-takeoff assessment is still largely guesswork
- No - Always need outside inspection
- No - Anything less than a thermal hangar or carwash at the hold short point is a half-ass solution that WILL kill somebody somewhere
- No - As an F/O I cannot make a reliable assessment of the wing surface from the cockpit/cabin of the a/c
- No - Because no last minute tactile inspection is provided prior to T/O
- No - At many stations we still deice at gate - then confronted with long-slow taxi to runway instead of deice near runway
- No - At my airline, mechanics are not involved in de/anti-ice proc. and are not to make comments/suggestions to air crews/deice crews. With their technical knowledge I think they should be part of the system
- No - At our regional airline, minimum wage, uneducated people are deicing over aircraft. They simply do not understand the severity
- No - Book answer says look out "ONE" specific window. I want to look at the wing from several different windows for better view
- No - Can't really tell from cabin/cockpit - especially @ night
- No - Can't see snow/ice accumulations from inside aircraft at night
- No - Can't see wings at night to confirm clean. Need to have deice equip at end of runway
- No - Cannot adequately assess cleanliness of the wing - (especially at night)
- No - Car wash style de/anti-icing procedures at the departure end of the runway are the only safe & efficient way to go
- No - Categories of precip at temp ranges too few. We need more types of precip added. Also, more guidelines about accumulation during long taxi times
- No - Cause to much concern over time - rush - inconsistent as to which ice (under wing frost) to remove
- No - Checking the wings from the pax cabin at night is a joke. The only thing I am sure of is there is no snow on the wings.
- No - Commuter airlines - not all - equipment & personnel training levels are barely adequate
- No - Confidence in the training and knowledge of the deice crew, especially the ones found in commuter operations
- No - De/anti-icing needs to be standardized at various locations. Every airport & every vendor does it differently
- No - De/anti-icing should be done at either the end of the runway or a centrally-located Swedish type fixed deicer
- No - De/anti-icing should be done at the end of runway for minimal exposure before T/O. Many times an a/c could be cleaned without de/anti-icing fluid 1st flight of day where it has snowed overnight-but clear
- No - De/anti-icing should only be done immediately prior to takeoff
- No - Deice at takeoff point
- No - Deice at the departure end of the runway and takeoff immediately!!
- No - Deice pads should be closer to the departure runways
- No - Deicing anywhere other than the runway end allows for creation of deadly complacency (I was deiced so I'm OK, even if it was 20-25 mins ago)
- No - Deicing at any time other than just prior to takeoff always raises concerns
- No - Deicing at terminals that are far away from the takeoff runway greatly degrade deicing safety margins, even with the Type II & IV with deteriorating WX conditions
- No - Deicing should be at the runway once pad with recovery systems to prevent pollution of the environment. The airport could provide deicing service under company & FAA supervision & result cost-saving
- No - Deicing should be done at runway not before
- No - Deicing should be done immediately to takeoff
- No - Deicing within 5 min of T/O roll e.g. Denver. is the best. Inspection by deicing crews outside a/c followed by T/O is far superior than gate deicing, taxiing 10min+wing inspect. thru fluid covered window
- No - Delays getting to runway inexperience/ignorance of some ground crews
- No - Delays in getting to deice areas, the same departure delays are still with us
- No - Depends on the facility/airport - some have poor communication between the pilot & deice crew
- No - Determination of presence of ice is too subjective-Just a guess. Why not a final outside inspection just before T/O? Holdover times unrealistic-Example, recently I had a HOT of 5-15 min. beginning when
- No - Due to excessive time from deicing procedure to takeoff time - towing aircraft out of ramp - starting engines - and taxiing + ATC control are not taken into account when holdover time is computed
- No - During heavy icing conditions, I do not believe Type I is sufficient
- No - During periods of precip, deicing pads should be setup at the runway area for ALL carriers, not just those who are "hub" personnel available
- No - Equipment is not maintained properly prior to storm season
- No - Every major hub airport should have a deice pad at the end of departure runways
- No - Feel comfortable with all co./fed. policies & regulations except for procedure to examine wing prior takeoff if any precip has fallen. While it's great idea in theory-in reality can't tell fluid failure
- No - Ground agents still take deicing as a pilot being too worried, or they are not trained properly thus providing us with bad information or a bad deice job
- No - HOT too short for ops out of large airports. Outstation crews invariably miss certain spots on the a/c
- No - Have seen Captains willing to push clean wing limits a little.(i.e. it'll blow off or not enough to worry about)

- No appreciation for wind chill factor during takeoff roll if temp is just above freezing
- No - Have to argue with company to get remote deicing
- No - Holdover periods are totally unrealistic
- No - Holdover time starts when application begins. It takes 30min to deice my a/c so no time is left for taxi/takeoff. It's a joke!! My own personal judgment as Captain is still the only safety device
- No - Holdover times are easily exceeded in many congested airports. Until the procedure is changed to spraying off a/c when #1 or #2 for takeoff, there will always be a chance for fluid failure
- No - Holdover times are too short - No ATC priority for takeoff
- No - Holdover times aren't enough. Airports have to participate by allowing us to deice closer to the departure runway
- No - Human element - enforcement of procedures
- No - I adamantly disagree with Jeff Carlsons letter which makes deicers the final authority for deicing
- No - I am comfortable about 65% of the time. My wing is with poorly trained agents or agents who do not follow the procedures the company has outlined
- No - I am not comfortable observing "clean wing" from the poor viewing position of the 737-200. Often the window is obscured by deicing fluid
- No - I believe we've unnecessarily complicated the matter. Simply was better
- No - I do feel comfortable, with the exception of a hands on tactile check in light freezing rain/drizzle. I do not think it is practical (or sometimes necessary) and to depart within the holdover time
- No - I fly a turboprop for a commuter airline. Too many times I find that the deicing equipment is not used properly and the ground crew does not follow deicing procedures properly
- No - I have no clue what I'm seeing when I look at a wing at night
- No - I think every effort should be made to be deiced by a car wash type operation in a runway pad near the runway
- No - I think sending pilot back to look at wings after deice regardless of how soon you pulled out of deice rack is stupid. Also overwing view from cabin is poor
- No - I think that airports should have a deice area immediately prior to the departure runway
- No - I would like to see a machine like the ones at some European airports
- No - I would like to see deicing always done at the end of the runway not at the gate. Delay until T/O should be minimized after deicing
- No - I would like to see deicing done at the end of the runways so you know the wing is clean and clean of ice before takeoff
- No - I would only feel truly comfortable were this consistently accomplished just prior to taking the rwy
- No - I would still like to see a "car wash system" right before takeoff
- No - I'd rather not sit & hold the yoke full forward during the entire procedure. Why not have the ground crew tell us when they start/stop deicing the tail
- No - I'm skeptical as to the level of care & training that the deice crews operate under. Are they able to assure the flight crew of a "clean" wing?
- No - I'm still waiting for an efficient application process to be developed (near departure end of runway) which will allow takeoff without delay after application - current system inconsistent
- No - If procedures were followed correctly the answer would be yes. Since the procedures have been implemented correct procedures usage by ground personnel has been on the decrease
- No - If you are really serious about ascertaining whether an a/c has ice on it, someone must check from outside the a/c just prior to dept. otherwise it's a judgment call (i.e. educated guess)
- No - In a line up for T/O when (HOT) is about to expire, there are no provisions with ATC to keep position if re-application is necessary. Push the (HOT) limit. Apply & go is necessary ops procedure as DEN
- No - In known icing conditions, there is no reason not to be checked/deiced (by maintenance or someone) just prior to T/O. (External physical check)
- No - In many cases taken out of hands of pilots. Definition has caused excessive amount of deicing to occur
- No - In my view, the only way to feel comfortable is to clean the aircraft just prior to takeoff at the end of the active runway
- No - In the past 2 years, I have only been deiced at a remote pad near the runway (DEN). I feel that deicing near the runway is of utmost importance
- No - Inability to takeoff at many airports prior to HOT expiration
- No - Inadequate training from airline regarding proper indications of de-anti-icing fluid failure. Difficulty in visually assessing the need for deicing in the first place
- No - Inconsistent - SOP varies from airport to airport
- No - Inspection from the cabin is very poor
- No - Inspections at my airline are done by people who don't seem to understand how to conduct a/c specific procedures i.e. DC-9 upper wing vs tactile hands on of the
- No - It all depends on the flight crews experience with snow/ice airport conditions
- No - It is difficult to accurately assess icing condition from inside the aircraft (contamination) when holdover time is close to lapsing, or when moisture conditions change
- No - It is not possible to assess the condition of the wings and control surfaces from the cabin on large airplanes, especially at night
- No - It is still a race to the runway. On the ATR a procedure needs to be developed so that we can tell on the high wing if the fluid has failed
- No - It is still difficult for the flight crew to actually see the condition of the wing leading edge after a lengthy ground delay. PARTICULARLY AT NIGHT
- No - It is too restrictive for the crew. Lawyers must love holdover times for their court cases
- No - It seems to be working because there aren't these icing accidents anymore. But it is hard to trust others to

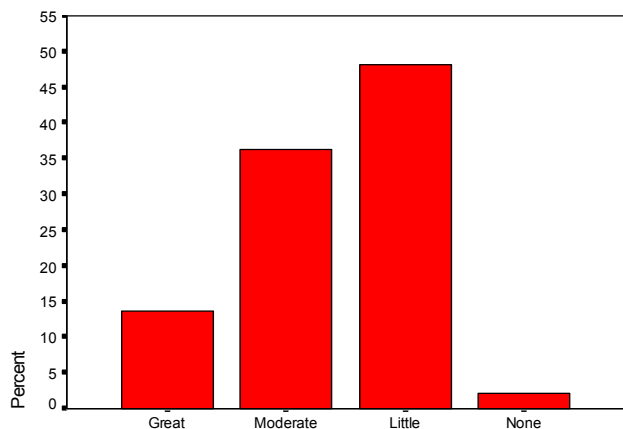
- deice properly. Also our airline only uses Type I, so it's hard to get out before contaminate.
- No - It should all be done immediately prior to takeoff i.e.) a drive thru type arrangement
- No - It still seems very time consuming to deice an aircraft
- No - It's non-standard from airport to airport. The airport should be more involved. A/C should be deice just prior to departure like at CDG, PIT @ all airports
- No - Keyword "comfortable". We are jumping through too many hoops just to satisfy the "regs". Let's deice at the takeoff end of the runway with Type I, then depart. End of story
- No - Lack of experience of ramp personnel actually doing the application of fluid
- No - Lack of remote deicing next to the runway
- No - Like to see better training for ground crews & flight crews (recognizing fluid failure), better eqpt (wing ice detectors, ground eqpt) greater availability of Type II fluid
- No - Little consistency from airport to airport on application locations and procedures
- No - MD80 clear ice inspection by mechanics is not taken seriously enough
- No - Major airports i.e. hub operations should have deicing rules like ops @ SDF to facilitate & expedite traffic flow
- No - Many captains (usually the newer ones) apparently believe an on-time arrival downline is more important than COMPLETE deicing
- No - Many ground personnel are not properly trained
- No - Many of the Captains are complacent about icing dangers & are reluctant to go back for deicing if in line for runway. Deicing stations should be drive-thru type & located just prior to runway
- No - More car wash operations at or near runway
- No - More needs to be done to deice closer to the takeoff runway to minimize time before departure
- No - Mostly still done at gate. It is always 10-20 mins before T/O. We need more effort to deice near runways
- No - My airline allows us to takeoff after the holdover time has expired, if a visual inspection is made. This puts us into unproven territory but we do it in the belief that is "proven"
- No - Need "car washes" at/near end of runways
- No - Need deice at r/w - expired time too short to do it elsewhere - Munich & CDG have best system
- No - Need end of runway deicing at all airports, or at least an end of runway check by someone outside the plane
- No - Need more deicing activity done closer to the departure runway and expedite departures shortly after completed
- No - Need to be at departure end of runway with fluid recovery
- No - Need to have system at departure end of runway + "car wash" system is best (as in Europe)
- No - Need to work on cutting deice to T/O time
- No - Needs to be done at or near the active runway
- No - Night time - very difficult to determine condition of wing
- No - No classroom training
- No - Not all carriers use remote deicing and should, furthermore it should be done @ the end of the runway with minimal taxi time
- No - Not at my company
- No - Not completely - need roll through spray near end of runway
- No - Not completely, the visual inspection is still a judgment call, dry or night. Especially in freezing rain or drizzle
- No - Not enough remote site - Immediate access to runway for T/O activities
- No - Not enough training for crews to identify icing.
- No - Not entirely - I fly MD-80's and feel like the ground people become somewhat casual about clear ice check
- No - Not every airport has deicing at the departure end of runway, limiting time between deicing and takeoff
- No - Not much different than before except now any problems can legally and fully be blamed on pilots
- No - Often done in too remote of location, pushing the allotted holdover time
- No - Often we deice when there is no need to
- No - Our airline does not use mechanics to deice. We use ramp personnel and the quality of the deicing is not there
- No - Our company de/anti-ices at a location which is at least five minutes from the end of the runways assuming no wait for other aircraft
- No - Our company does not make Type IV fluids available to us at non-hub airports
- No - Our personnel seem to be trained to the minimum. If the FAA is watching they do a much better job of deicing
- No - Outstations have only Type I fluid
- No - Overkill. Common sense doesn't qualify anymore
- No - Pilots looking through cabin windows obscured by deicing fluid are unable to safely determine if the wing is clear of ice or snow
- No - Pre-takeoff inspections by aircrew done from the cabin or cockpit are inadequate
- No - Prefer at the runway or remote deicing
- No - Procedures & communication of deicing are NOT standardized, despite airline management attempts
- No - Procedures for inspection both pre and post "HOT" expiration, are difficult to determine a "clean wing" and are confusing. Public perception & knowledge are driving decisions in cockpit. NOT SAFE
- No - Procedures put a time constraint many times in conflict with ATC time constraints and other procedures
- No - Regs will be used to indict the pilot even if procedure is followed
- No - Regulations should require threshold contamination check (exterior) and/or threshold deicing
- No - Relies too much on relatively unskilled ground crews for inspection and deicing
- No - Remote deicing in poor holdover WX conditions doesn't work with large aircraft by the time deicing is complete, often holdover time has expired
- No - See above A.(On a larger a/c with two deice trucks what ever areas was sprayed first has exceeded HOT-often), also to time are holdover times we're told what time the last procedure was started. On a larger a/c

- with two deice trucks what ever areas was sprayed first has exceeded HOT-often
- No - See above, also it's really hard to know what to look for
- No - See enclosed letter
- No - See question A3 (Some airports, the person applying the fluid doesn't know or isn't aware of the rules regarding HOT and is jot forthcoming with apply and end of application unless asked)
- No - Several major airports have built large pads for deicing just prior to T/O. Yet still do almost all deicing at gate. Pads were great waste of \$.Believe deicing just prior to T/O provides safety margin
- No - Short holdover times are unrealistic & economically unsound
- No - Should always be at the T/O end of the runway with a "catch basin" for recycling/environment & expediency to T/O
- No - Should be closer to departure end of runway in many cases
- No - Should be deiced at runway prior to takeoff
- No - Should be deiced at the end of the runway prior to takeoff
- No - Should be done as in Europe, right before taking active for takeoff
- No - Should be done at the runway! Not the gate
- No - Should be done at the takeoff point by the airport authority for all airlines. The politicians are playing with our lives
- No - Should be just before takeoff - first come first serve - just before runway on a taxi through basis-automated with inspectors oversight of completeness
- No - Should be situated closer to the departure runway so do not use as much of holding time
- No - Should deice at runway, under severe conditions
- No - Should never have deicing fluid on windshield. Think most of it is overall, wasteful, & bad for the environment. Think holdover times are more conservative because there are many variables for accuracy
- No - Some airports are still using the outdated method of deicing at the gate rather than remote deicing
- No - Some airports, the person applying the fluid doesn't know or isn't aware of the rules regarding HOT and is jot forthcoming with apply and end of application unless asked
- No - Some deice personnel "rush", use poor terminology, in general can't wait to get back into a warm environment-BFD, BAD SVC
- No - Some pilots are still concerned with the schedule & will forego deicing because it will take "time"-this is inexcusable @ any level-especially the transport level!
- No - Sometimes too long a delay before takeoff
- No - Still difficult detect clear ice top MD80 wing fuel tanks using present procedures. Ice buildup occurred away from inspection stripes, not visible/discernible from inspection/cabin
- No - Still difficult to determine if wings are ice-free. Visual check being done by most junior & inexperienced crew member
- No - Still inefficient therefore less effective
- No - Still need deicing at runway prior to T/O
- No - Still no way of knowing for sure, especially when it is dark, if the wing is still clean
- No - Still not using standard phraseology, & procedures. Not enough remote pads near runways
- No - Still not performed close enough to takeoff runways
- No - Still too much room for doubt. When marginal, lean toward spray-down & sometimes face resistance from deicers who deem unnecessary. Also, T/O time in marginal conditions, how do you really know for certain that you are frost, ice, snow free without getting out there?
- No - Still, most airports are not setup for deicing immediately prior to takeoff. Too much time between deicing and departure - especially at ORD!
- No - Though the procedures are generally effective - they are relatively complex and the final responsibility is still ENTIRELY the flight crew's
- No - TSA has poor organization in their deicing program. They don't deice near the end of the departure runway. Many outstations have inoperative deicing equipment
- No - Takes to long to takeoff after deice
- No - Task is very wasteful with each airline doing its own deicing at most major hub. Not done close enough to end of departure runway with this approach. Deicing needs to be handled in car wash manner
- No - The "visual inspection" through a cabin window is almost worthless, & I've had crew members tell me "it looks good" when I could see slight accumulations on nose ahead (where fluid was applied). etc.
- No - The ATC delay is the biggest problem - de/anti-icing immediately prior to takeoff is the only answer
- No - The a/c needs to be deiced at the end of a runway (not at a remote area) and when the F/O look out the side window prior to takeoff for wing contamination, what a joke all he see is DEICE FLUID
- No - The car wash type of system should be at the end of all runways at all major airports
- No - The holdover times are not realistic - they start at the beginning of the last deicing application. It is almost impossible to achieve takeoff within the holdover time
- No - The only part that is uncomfortable is the very restricted and limited view of the wing from a cabin window. It is sometimes difficult to tell if the surfaces are contaminated or not
- No - The only safe way to deice is to do it just before take the runway - no delay
- No - The only way to guarantee a clean wing and clean a/c is a deicing pad near the departure runway
- No - The only way to have an adequate comfort level is to have a common deicing area at the takeoff end of the runway
- No - The program is good, but the rules must be followed
- No - The qualified deicers are not trained properly. They are not knowledgeable on the procedures etc.
- No - The visual inspection just prior to takeoff from the cabin windows at night during precip is very difficult to make an assessment
- No - The waste and environmental impact is a concern
- No - The whole decision to go rests with flight crew in the cockpit. Sometimes a little help on the outside would be very beneficial

- No - The whole system still moves too slowly. Even with the extended times available with new fluids the times between de/anti-ice and takeoff can be lengthy
- No - There are "times" when VISUAL checks from within the a/c are difficult to make/discern; as to whether the surface of the wing is clear
- No - There is no performance penalty to using deicing fluid. It could be a problem for abover due to slick runway
- No - There is still no sure way to check for contamination on the entire a/c when at the end of the runway
- No - There is still some question as to whether or not all deice personnel are properly trained
- No - There still exists a lack of communication between cockpit crew and deicers
- No - They confuse ground personnel and add cost
- No - They need to be more available near the end of runways
- No - This winter our management decided to have deice decision made by GSA's who would not even be on trip. They erred toward deicing in every case, disregarding temp., snow depth and ADHERENCE. Very bad.
- No - Though a great improvement the procedures vary so much from station to station-very thorough at one, poor at another
- No - Timing of application with FOM holdover times could be greatly improved
- No - To actually tell if plane is ice free is to "tactile test" if just prior to takeoff by a pilot or WELL trained ground personnel
- No - Too complicated
- No - Too difficult to make a clean wing assessment looking out windows covered with fluid and snow-we should all be deiced at the departure end of the runway thereby negating the overwing clean check
- No - Too little holdover times under most adverse conditions
- No - Too long of a wait between deice and takeoff
- No - Too many restraints. Holdover times too short to be practical
- No - Too much CYA
- No - Too much anti-icing when not necessary
- No - Too much differences in equipment and training - skill between stations
- No - Too much disparity between airports (i.e. deice procedures, fluid availability)
- No - Too much emphasis on holdover times
- No - Too much guessing involved, particularly at night
- No - Too much guessing (if you are delayed for takeoff) if you are still good to go
- No - Too much phraseology. Takes too long. Non-standardization between stations, especially outstations. Too many shortcut, half-assed solutions!
- No - Too much time between deice and takeoff
- No - Too much time from deice to t/o
- No - Too often at great expense economically and environmentally. Will come back to haunt us
- No - Too slow. The wait can be up to an hour to get deiced. This affects crew fatigue, fuel, schedule
- No - Too time consuming! Need a plan for deice facilities at end of runway just before T/O so there's no delay @ gate and/or deice pad
- No - Try to remove subjectivity from pre-takeoff contamination check
- No - Two problems - overuse, i.e. using on light, non-sticking snow with temp below 10F, and ambiguity over shearing of Type II/IV fluids-can there be snow visible on top?
- No - Type I doesn't give a long enough HOT under many circumstances - especially at congested airports, such as DTW
- No - Type I too often used - HOT too often exceeded at "busy" airports
- No - Type IV fluids are not always at certain city airports
- No - Use of Type II & IV should be mandatory
- No - Use too much fluid. Procedures are too cumbersome taking too much time
- No - Variety of procedures, fluid types/concentration, airport arrangements, required checks. It's a challenge each time to see if you're LEGAL! It's easy to assess if the a/c is safe to fly, legal, challenge!
- No - Verification that surfaces are clean is not always easy to do
- No - Very short holdover times in FAA guidelines place pilot in position of making judgment calls with not enough information available from cockpit
- No - Visual a/c inspection of the wing from inside cabin at night is a joke. Fluid running down over window & lack of light on the wing. Minimum wage workers with a step ladder would be able to judge better
- No - Visual checks from the cabin on a dark night peering thru craxed cabin windows provides only perfunctory knowledge of the actual condition of the wing
- No - Visual inspection from inside the cabin after holdover time has expired, particularly at night, is a travesty, a total joke
- No - Visual inspection inside the aircraft often impossible
- No - Visual inspection is nearly impossible from a/c night or day. It is difficult to determine wing status with fluid on/masking wing surface/holdover times value are used
- No - Visual inspections from inside the cabin/cockpit are not accurate/reliable
- No - Visual inspections through cabin windows provides little or no verification - especially at night
- No - Wait in line for deicing, wait in line for T/O
- No - Waste of money. See A1. Why isn't deicing done at the departure end of the runway so takeoff can be done in a timely manner. That is what the morons at the FAA should be mandating
- No - Way to extreme. ANY contamination results in deice which = \$ environmental damage
- No - Way too early at big airports i.e. waiting in line for T/O 1 hr. Need end of runway truck or car wash to clean up a/c
- No - We are still subject to long waits between deice and takeoff. Deice pads near the runway with fluid capture methods is a must
- No - We are wasting time & money deicing aircraft in temps where there is no possibility of ice occurring i.e. temps well above freezing

- No - We get deicing when we do not need it to cover our 6. Ground personnel have more control over the decision than we have
- No - We leave gate with verbal confirmation deicing is complete. We don't look at wing until just before takeoff. There is no chance to compare appearances
- No - We need a "car wash" deicing pad at #1 for takeoff with 4-6 nozzles hosing down the aircraft, then there would be no question of holdover times
- No - We need a quantifiable measure to confirm a clean wing
- No - We need final deicing at the runway if needed
- No - We need more deicing closer to planned departure runways, not deicing at the gates
- No - We need more remote deicing facilities near departure runways!
- No - We need to deice at the dept. end of the runway. FAA will not fix ATC so we taxi for long periods after deicing at pad
- No - We need to have skin sensors to tell how cold the wing actually is. Is the precipitation melting on the wing or freezing?
- No - We should have snow man vehicle at end of runway making a physical check of each aircraft prior to takeoff
- No - We spray when it is unwarranted, degrading safety in those conditions, because marginally-trained people make the call
- No - We still do not have complete control of selection of fluid type. Deice locations often not close enough to runway
- No - We still need more end of runway deicing pads to eliminate time exposure to icing conditions after deice and prior to takeoff
- No - When I am a pilot I feel comfortable, when I am a passenger, because of what I stated above I don't feel comfortable
- No - When I ride as a passenger I am uncomfortable because some of our pilots still choose to takeoff with snow and/or frost on wings-in order to save money & be on time
- No - When exceeded HOT, procedure is to look wings-is PR show for pax at night-impossible or highly improbable to accurately determine condition of wings from inside a/c.
- No - Why, in the US we don't have Gantry deice systems like in Europe is beyond me. Shows governments inability to deal with problem effectively
- No - With the use of Type I fluid at some airports-you exceed holdover times before you finish deicing procedures
- No - Would like deicing to take place closer to actual takeoff
- No - Would like to deice just prior to takeoff and not at gate. I don't like non-pilots telling me I need deicing after my walk around found no ice (twice this winter)
- No - Would like to see deice area closer to departure runway, with shorter holdover time before T/O
- No - Yes at my own airline, but other airlines are lacking the uniformity I feel is needed for safety (refer question A1 above)
- No - Yes & no, OK with company deice. Suspect of "contract" deice crews. Also, order of deice a/c surfaces is poor. Tail & horiz stab should be last, so if you visually check wing, know tail better condition
- No - Yes, if aircraft on ground with snow or ice on it, usually a good job done. No, if flying into rime or clear ice, land and asked to be deiced for inch or two accumulation, ground crews aren't aware of non-heated surfaces, such as under the rear flaps, inboard of engines, and Boeing says ice doesn't accumulate on tail - I've seen it.
- No - Yes, only when deicing is done near departure end of runway
- No - Yes-if done near rwy & T/O if snow. No, when done @ gate & delays are taken before T/O. We have 3 large pads near the rwys @ O'Hare-why don't we use them?
- No - You can't see the wing from the cockpit on the DC-10. I think we should ALWAYS check the wing from the cabin on the DC-10. We don't
- No - a)ground personnel for deicing seem to be new/and inexperienced or don't care) each season, b) training given flight crews is minimal c)crews themselves downplay importance of deicing (i.e. it's only..
- Inv. resp. - Many times the decision to anti-ice is made with no input from flight crew
- Inv. resp. - A lot of overkill occurs. Captain's authority has been taken away
- Inv. resp. - All major airports should have deicing right at the end of the runway - a car wash facility
- Inv. resp. - Cabin inspection of wing surface at night is very difficult. Should ALWAYS be tactile when required
- Inv. resp. - I wish all airports had a kind of "drive through" process at or near the runway. See below
- Inv. resp. - No, there is no way to adequately insure an airplane is clean when view - in the windows from inside the airplane
- Inv. resp. - Only moderately comfortable
- Inv. resp. - Printed guidance contains many vague expressions, ex: aerodynamic acceptance criteria, active frost! Whew!
- Inv. resp. - Somewhat is a better position
- Inv. resp. - Somewhat, especially when my company deicers spray in Chicago and CCN adequately view their work
- Inv. resp. - Somewhat. CK Paris procedure! Why can't we have a similar operation in the U.S. Taxi thru deicing pad (fluid recycled) and takeoff
- Inv. resp. - Still uncomfortable with some completely useless holdover times. Example any holdover time shorter than the time it takes to complete deicing is useless
- Inv. resp. - Too much of the decision making process has been removed from the right crews
- Inv. resp. - The higher the level of aircraft activity the more important it is that aircraft be deiced enroute and near the departure end of the runway

A4(a) In your experience, how much variation is there in the quality of de/anti-icing service provided at airports in North America. The variation is:



Variation in quality of de/anti-icing service in N.America is:

[Invalid responses: 80 (5%)]

Comments:

Great - 28R at Pittsburgh got it right (Deice pad at dept. end of airport (28R))
 Great - A small commuter airline outstation is fair to poor at best as it regards to quality of deicing
 Great - Ability to depart before holdover time expires is biggest difference
 Great - Again, each airport is different depending on the commission
 Great - Airline outstations equipment is awful
 Great - Airports in the Southern U.S. (e.g. SDF, TYS, CVG) that do not get bad WX often, simply don't have the experience or eqpt to deice the a/c
 Great - Airports with deicing stands/pads near runways much better
 Great - Airports with deicing stations at the end of the runway are much better
 Great - All airport locations, procedures, timings differ
 Great - Although my domestic flying has been limited through the past 3 years
 Great - Certain airports have better facilities i.e. - PIT where you are already at the end of runway
 Great - Compare Pittsburgh to Decater, IL
 Great - Dallas and ATL will never handle the odd ice storm as well as MSP-ORD & DTW handle heavy snow
 Great - De/anti-icing stations should be setup at end of runway so a/c are sprayed just prior to departure
 Great - Dedicated airline employees are more consistent than 2nd tier vendors
 Great - Dedicated deicing ramps are great
 Great - Deicing is lousy at stations where our company has only 3 or 4 flights daily
 Great - Deicing should be at remote area for all airports
 Great - Denver automated vs smaller a/p

Great - Depends on the facility/airport. Some have poor communication between the pilot & deice crew
 Great - Difference in equipment is significant
 Great - Due to type of fluids available
 Great - Each airline has to deice or contract to deice creating a wide variety of procedures
 Great - Each station has different attitudes and fluid type
 Great - F/O told me of a deicing inspection (upper wing ice) that the inspector interpreted the upper wing to be the horizontal stabilizer!
 Great - Few, if any, ground personnel use standard terminology. Almost no one states as per com.
 Great - Fire dept. trucks with straight water does not compare to heated 60/40 Type I or types II or III
 Great - From "car wash drive thru" to hand held pumps
 Great - Great difference in the efficiency not in the quality
 Great - Ground crews at "outstations" always seemed "surprised" to be required to deice early flights
 Great - Hubs (ORD) good, outstations - weaker
 Great - Hubs do the best - outstations vary
 Great - Hubs have excellent equipment and procedures - outstations are lacking in equipment plus no Type II or IV provided
 Great - I find our hub offers best service. Outstations are most likely to provide poor service, due quality of eqpt as well as training....
 Great - In big cities it's great, but when our low budget company perform we have to police them & usually instruct them
 Great - JFK to PIT
 Great - Just look at the procedures there are no two the same. How can they all be the best
 Great - LGA controllers do not cooperate with planes requiring deice
 Great - Large variations in %'s of fluid mixtures
 Great - Little standardization
 Great - Location of deice in reference to runway of departure
 Great - Location of deice pad to runway is of paramount. Important to minimize ground delays
 Great - Location of deicing pad
 Great - Many outstations have poor eqpt. Often takes over 15 min. deice/anti-ice Jetstream 32. By that time am past holdover time, must restart
 Great - May be deiced by 2 trucks at once or only 1 truck taking longer, eating up safe holdover times
 Great - Most airport that experience significant winter weather do very well. Some warm weather stations perform poorly
 Great - More car wash operations at or near runways
 Great - Most hubs have Type II & IV & quality equipment. Most outstation only have Type II & moderate equipment
 Great - Most all use the same procedures
 Great - Most don't know the rules!
 Great - Much more comfortable when a/c is deiced at a remote pad just prior to takeoff vs at gate
 Great - My airline does superb job of de/anti-icing a/c but there are often times when ground/tower personnel have no clue regarding the handling of aircraft in freezing moisture situations. FAA personnel need more awareness.

- Great - Need standardized, remote pads at all airports prior to T/O
- Great - Needless to say adequate ground support facilities are a must
- Great - No one uses the correct verbage
- Great - No standards set for application (on gate, remote)
- Great - No two airports are the same
- Great - Not enough SOP. Too much personal opinion on fluid choices in varying conditions
- Great - Not enough space for remote deicing at most airports
- Great - Out stations vary greatly especially when using contractors, other than NEW
- Great - Personnel at outstations sometimes do not know what is expected of them
- Great - Poor training of deicing crews in different locations results in non-standard info to aircrews
- Great - Priority & end of runway deice important
- Great - Quality of equipment and training vary a lot
- Great - Quality of the process is similar, time required is not. Canada's procedures complete the process much faster
- Great - Remote deicing pads adjacent to runways - best method
- Great - Remote deicing vs gate deicing
- Great - See above comment (Too much parasology. Takes too long. Non-standardization between stations, especially outstations. Too many shortcut, half-assed solutions!)
- Great - Seems as Airports and FAA have left all deicing arrangements up to the airline companies. Therefore, major variations around systems
- Great - Small airports have inexperienced deicing personnel (CMI, crew drove deicing truck into the a/c causing damage)
- Great - Small airports, not so good
- Great - Smaller airports that regional a/c fly into often offer below standard deicing
- Great - Some Canadian stations use minimal fluid application; some U.S. stations over apply resulting in delay
- Great - Some airports have excellent systems MSP - some poor STL
- Great - Some airports like Memphis run out of deice fluid constantly
- Great - Some are provided by the airport while other rely on each operator
- Great - Some contract deice crews don't know standard deice patterns & procedures
- Great - Some deice at gate others at end of runway which is better
- Great - Some equipment isn't-some personnel desire to do good job. Some try to get by with least effort!
- Great - Some of our outstations have pitiful deicing equipment. Please note that it's not fault of ground personnel, company not supply eqpt
- Great - Some of our stations have very poor equipment
- Great - Some outstation contract deicing is sub-standard. Personnel need more training
- Great - Some stations, which get infrequent ice or FROST - still don't understand deicing plan
- Great - Sometimes, you're getting deiced by contractors who really have no standardization
- Great - Taxi times after deicing vary too much. Deicing pads should be within 5 minutes of takeoff
- Great - The "car wash" system (PIT) works best
- Great - The "insecticide" sprayers used by my company at most airports leaves a lot to be desired
- Great - The deicing at STL is OK, but all outstation have little to be desired
- Great - The stations having major airline service are good. The code share operations tend to be inconsistent except at our hub (excellent)
- Great - There are too many variances to list
- Great - Think about it. MSP vs ATL? vs Dallas?
- Great - This is as varied as the number of airports
- Great - Though a great improvement the procedures vary so much from station to station- very thorough at one, poor at another
- Great - Too many contract deice crews. Training is poor due to high turnover of employees
- Great - Toronto CA is a drive-thru with eng. running
- Great - Training & enthusiasm of workers
- Great - Type I fluid used when Type II or better needed at many locations
- Great - Type IV not available everywhere
- Great - Would like to see more closer to runway
- Great - We use contract services which vary greatly
- Great - Widespread availability of Type IV would help
- Great - Your deicing is only as good as the crew who accomplished it
- Moderate - A lot has to do with experience of deice team
- Moderate - Airport/airlines which have procedures for pass thru / multiple truck, engines running deicing close to the departure end of r/w are advantageous. They have the least exposure to the precip which is my goal. Overall, my deicing experiences this winter have been good.
- Moderate - Airports with frequent de/anti-icing do a good job
- Moderate - All airports need a "pad" near the departure runway for minimum delay after deicing
- Moderate - All providers don't follow prescribed procedures
- Moderate - Answer I want is #3 (little variation)
- Moderate - At own airline hubs deicing is thorough & complete. However at outstations the procedures/fluids are different
- Moderate - Availability of Type II & IV varies according to airport
- Moderate - Better at hubs. Unknown quantity at outstations
- Moderate - Better to deice closer to the active runway
- Moderate - Between hub airports and outstations
- Moderate - Bigger stations tend to do a better job
- Moderate - Cold WX stations seem better equipped - personnel & equipment
- Moderate - Companies are standardized, airports are not
- Moderate - Company hub airports service is very standardized, good, thorough. Some spoke airports same co. service tends to be less standardized.
- Moderate - Company owned/operated deicing stations are significantly superior to non-IZI/operators/contract deicing services

- Moderate - Company provided vs contract provided
- Moderate - Contractor vs carrier providing deice. Often contractors are not familiar enough with company procedures
- Moderate - DEN - DAL had 4 trucks working on it/TWA had 1 truck??
- Moderate - DEN - Poor deice extremely slow
- Moderate - DIA is about the best model
- Moderate - Deice pads, vs gate deicing VRS who actually applies the fluid, co. or for hire
- Moderate - Deicing needs to be done as close to the runway as possible
- Moderate - Deicing performed by company personnel - Quality varies with individuals
- Moderate - Deicing procedures go more smoothly (time/coordination) where crews are more used to performing them. Feel all crews are fairly equal
- Moderate - Deicing procedures seem archaic for today's technologies
- Moderate - Delays vary according to existing facilities
- Moderate - Denver vs Tucson
- Moderate - Depending on contractor for services - some take 1/2 hr to deice. Airports do not deice. Airlines or contractors do
- Moderate - Depends mostly on available equipment at airport
- Moderate - Depends on size & frequency of service
- Moderate - Depends on size and training of station
- Moderate - Differ mainly in deicing location and procedure
- Moderate - Difference is with the knowledge of ground personnel
- Moderate - Differences exist but safety is not compromised
- Moderate - Distances vary from deice pad to runway- consequently holdover times
- Moderate - Drive thru deicing at PIT is great - deicing at the gate at a busy airport is the worst
- Moderate - Drive thru vs the single deicing truck
- Moderate - Due to (1) remote pad deicing (2) availability of Type IV fluid
- Moderate - El Nino has had an effect this year, not as much deicing
- Moderate - Equipment varies from place to place
- Moderate - Even though the procedures seem specific, different airports have different qualities of service
- Moderate - Experience
- Moderate - Factor is usually the "Company" involved, not the "airport"
- Moderate - Gate deicing procedures seem to be better for handling large # of aircraft
- Moderate - Generally more experience in deicing at large hub airports
- Moderate - Greatest difference is in availability of eqpt/crews, not quality of deicing work performed. Quality of work is difficult to judge/see
- Moderate - Have not had that much experience to recall
- Moderate - Hub stations OK many others understaffed
- Moderate - Hubs - good, outstations - some good, some shaky
- Moderate - Hubs are best, outstations are not as good
- Moderate - I feel the deicing pads can get you deiced quicker from start to finish
- Moderate - I feel this is more of a personnel issue than an airport operations issue
- Moderate - I fly to a limited number of larger airports now. A few years ago, when I flew smaller eqpt to smaller airports, felt they were lacking
- Moderate - I realize the question says "North America" but the best I have seen is Ottawa, Ontario
- Moderate - If a station has a need for Type I, I expect to find conditions which might require Type IV yet some station provide Type I only
- Moderate - If by quality you mean length of time to get thing done as well as quality of service provided, otherwise the answer is "Little"
- Moderate - In general, the stations with the most actual experience do the best job
- Moderate - Inconsistent training
- Moderate - It seems that smaller stations are not as efficient
- Moderate - Just like security - each airport different
- Moderate - Large airports vary little, but smaller ones vary more
- Moderate - Larger airports tend to be better. Example: drive through "car washes"
- Moderate - Larger hubs provide Type IV, outstations do not
- Moderate - Less quality at airports in the southern U.S.
- Moderate - Little stations seem to have more problems with procedures
- Moderate - Location is very important, but varies widely
- Moderate - MEM is BAD
- Moderate - Make more airport responsible - less airline responsible paid for 84% of airline flights at that airport
- Moderate - Many smaller airports do not supply Type IV
- Moderate - Moderate at my airline
- Moderate - Most deals with proximity to the runway
- Moderate - Most non-hubs have Type I fluid only
- Moderate - Most of my experience now is in major hub airports where eqpt and training are good
- Moderate - Naturally bigger airports will have more equipment
- Moderate - Need emphasis on immediate departure
- Moderate - Newer airports are obviously better equipped
- Moderate - No bad experiences with deicing
- Moderate - No standardized communication with ground to cockpit
- Moderate - Non-standard COMPANY verbiage
- Moderate - North station have better qualified personnel
- Moderate - Not all airports have all the fluid types
- Moderate - Not enough standardization
- Moderate - Obviously, better in places where practiced most
- Moderate - Off gate deicing vs gate deicing
- Moderate - Outstations that are limited to Type I fluids
- Moderate - PIT (X 3 responses)
- Moderate - PIT is great
- Moderate - PIT is outstanding
- Moderate - Personnel proficiency, SOP compliance
- Moderate - Pittsburgh vs St. Louis
- Moderate - Position relative to runway end varies
- Moderate - Primarily differences in fluid types (we could get deiced three times in one day with three different types of fluid)

- Moderate - Quality good at hubs. Standardization at outlying stations needs improvement. Generally applies to outlying stations
- Moderate - Regional airline outstation equipment is sub-standard
- Moderate - Some at gate/some on taxi by departure
- Moderate - See A-3 it is a battle at certain stations to get a thorough deice without constant supervision-primarily because of lack of familiarity with critical surfaces that are unique to turboprops (esp. propellers). Some ground crews seem only to know about turbojet procedures.
- Moderate - Several airports have only Type I fluid
- Moderate - Small contract deicing are normally not trained as well as major carrier deicing crews
- Moderate - Some airports are nicely configured & the deice flows smoothly (PIT). Others aren't - STL
- Moderate - Some airports have remote pads, others spray you at gate
- Moderate - Some airports have strange ways i.e. White Plains NY (HPN) need a SOP type of de/anti-ice procedure
- Moderate - Some do not have Type IV
- Moderate - Some of the smaller stations, are in a hurry for on-time, and have told me I don't need it, etc.
- Moderate - Some outstations are not as standardized
- Moderate - Some people deicing still don't understand how much is needed. Sometimes you get way too much-others I feel is too quick
- Moderate - Some places only offer Type I or II and no Type IV
- Moderate - Some smaller airports don't heat the fluid and/or take so long that it's useless
- Moderate - Some smaller facilities could improve
- Moderate - Some stations do an excellent job others not
- Moderate - Some stations spray a/c differently, some only have Type I 50/50
- Moderate - Some stations still just want to clean only wings
- Moderate - Some ground deicing crews are more diligent & thorough than others. I deicing crew was very sloppy & left visual ice on wing saying deicing complete
- Moderate - Southern airports not ready for ice/snow conditions
- Moderate - Specifically - time from application to takeoff point
- Moderate - Stns that don't deal with it on a regular basis are not as well prepared as those that do.
- Moderate - Sub-contractors at small stations have many different procedures to deal with from all the carriers they service
- Moderate - The airport layout, space available is usually biggest factor
- Moderate - The busier the airport, the more qualified personnel are doing the deicing
- Moderate - The further south, the worse it gets to the point of non-effectual below the Mason-Dixon
- Moderate - The ground crew training is the key
- Moderate - The major hubs have the best operations
- Moderate - The new airports are better
- Moderate - The quality of de/anti-icing depends on the operator (of the deice equipment)
- Moderate - The type of delivery system is important, i.e., taxi thru vs truck
- Moderate - The variation I see is primarily in how efficient and timely the deicing procedure is - not the final result
- Moderate - There should be more of a universal deice policy. No matter who you work for or use to deice
- Moderate - They all do a fine job once the job is done but some take longer. I dislike DIA
- Moderate - They are much better than when the new procedures first came out
- Moderate - This comes directly from each airlines available people
- Moderate - Those with the shortest taxi time after application are best
- Moderate - Time of last step is subjective
- Moderate - Training and understanding of the importance of their jobs, varies greatly at many small airports
- Moderate - Training of personnel
- Moderate - Training, experience of contractor
- Moderate - Type II and IV not available at all facilities, usually not required either
- Moderate - Usually the farther North the better the service
- Moderate - Variation between good weather & bad WX airports
- Moderate - Variations are due primarily to time - distance to runway & manpower available to do deicing
- Moderate - When you deice at gate then go wait in line for t/o
- Moderate - Worst airports are where they still do it at the gate
- Moderate - You always do better in your own hub
- Little - 99% done by seasonal airline employed crews
- Little - Airline and vendor service is very good
- Little - Airline provides same level wherever I go
- Little - Airports that are unaccustomed to winter or worse
- Little - All de/anti-ice provided by company trained crews
- Little - All deicing has been accomplished by same company
- Little - All done by company
- Little - All done by my company
- Little - All our services are done by our company, so there is little variation
- Little - All stations seem to do good job, but how close to takeoff is the problem
- Little - At airports I operate into
- Little - Because it's all done by my company
- Little - Because our company is responsible for all our deicing - procedure are standardized
- Little - Cannot see most of the procedure from the cockpit
- Little - Communication from deice crews of type, mix, time of last step not always consistent
- Little - Company has its own standard
- Little - Company is very good about standardization including contract deicers
- Little - Company personnel seem well trained
- Little - Company procedures standardized
- Little - Contracted deice seems to be applied better than company for some reason
- Little - De/anti-icing is good everywhere, the location (end of runway/ramp) makes the difference

- Little - De/anti-icing service provided by same airline U.S. wide
- Little - Deicing probably OK. Question training for if inspection to determine if need deice
- Little - Deicing provided by my company very consistent
- Little - Difference in notifying crews deicing is to begin of has begun
- Little - Difference is in speed & efficiency
- Little - Everyone seems real concerned
- Little - Everyone seems very concerned about safety
- Little - Everyone seems well educated procedurally
- Little - Except for Memphis - little difference among stations
- Little - Experience only with company deice and that's good
- Little - Getting better
- Little - Good airline
- Little - Good procedures, just closer to runway is much better
- Little - Great differences in speed, but not quality
- Little - Hard to judge/rate quality within airlines but age & availability of eqpt is a factor
- Little - Have not deiced enough this season to determine best/worst
- Little - Have only used deicing extensively at JFK & STL
- Little - However, I only fly into major hubs
- Little - However, only use DTW/MSP/EWR & LGW/CDG/FRA
- Little - Hub airports provide best service
- Little - Hub stations seem to have more experience
- Little - Hubs versus stations
- Little - I believe that the Northern Airports have the best service due to the requirement to deice more than at Southern airports
- Little - I find it best when I can deice and get airborne ASAP
- Little - I fly 757 & do not go to a wide range of airports. Most of my destinations are the larger better eqpt airports
- Little - I work for UAL
- Little - I work for a major & things are relatively STD ZD
- Little - I work for a well to do major, the program is basically consistent at all stations
- Little - In the last 3 years, I have only experienced deicing at MSP and DTW
- Little - It is the pilots responsibility to ensure across the board quality service
- Little - Larger airports usually offer Type II or IV fluid where smaller normally only have Type I. However, holdover does not need to be long..
- Little - Limited ramp space create enormous delays at our smaller heavy use airports. HOT often expires.
- Little - Minor differences in communications between ground and air crew
- Little - Most airports try to deice at the runway- a goo idea!
- Little - Most deicing is done by company trained people/equipment
- Little - Most do a good job
- Little - Mostly just different verbiage in communicating
- Little - My airline has an excellent program
- Little - My airline requires training to deicing personnel even to contract companies
- Little - My airline seems pretty standardized throughout the system
- Little - My company does a good job
- Little - My company does a good job at all stations
- Little - My company has good standardized procedures
- Little - My company has implemented very standardized procedures
- Little - No variation because all my deicing done in-house by company
- Little - No worst, all OK or better
- Little - None among company workers
- Little - Not much variation IN MY experience
- Little - ORD
- Little - ORD needs to utilize in recently built deice pads
- Little - One experience by recently "contracted" deice crew in PDX was unbelievably bad
- Little - Only difference is hubs have "car washes"
- Little - Only real difference are in speed
- Little - Only talking about MY airline
- Little - Operator technique
- Little - Our airline either does it's own or has a contractor trained by our company to do it
- Little - Our company conducts 95% of our deicing ops
- Little - Our company personnel handle deicing & procedures are well standardized
- Little - Our company provides training and personnel for de/anti-icing
- Little - Our company provides uniformly equal quality services regardless of base of operations
- Little - Outstations limited to type I fluid
- Little - Pretty consistent quality service
- Little - Pretty standard at our company. We don't have much FBO or offline deicing crews
- Little - Provided by company
- Little - Rarely have to request wing inspection at my company (done automatically)
- Little - Smaller airports may be limited by equipment/personnel
- Little - Smaller stations don't always have Type IV but you usually can get right off the ground without waiting
- Little - Some airports the icing crew taking over without asking
- Little - Some are more efficient than others
- Little - Some only have Type I available (that we serve)
- Little - Some small airports just have Type I
- Little - Stations that seldom deice have greatest variation and stations where another airline or vendor does the deicing have more variation
- Little - Stations where we use contract deicing show some variety
- Little - TORONTO
- Little - The actual quality varies little, it's the amount of time it takes to get deiced that varies
- Little - The complexity of the procedure varies more than the quality of the service
- Little - The knowledge of ground personnel varies the most
- Little - The service is usually provided by my carrier
- Little - The smaller stations seem to have less training
- Little - The workers do a good job but access to runway for T/O varies
- Little - Traffic flow/taxi time vs holdover/fluid failure is still a problem at the busy airports

Little - Type of fluid available. Quality of trained people is the variation

Little - Uniformity has improved greatly last couple of years

Little - Usually a function of service providers experience

Little - Usually depends on the individual personnel, motivated vs disinterested, company vs contract

Little - Variations in communications & procedures

Little - Varies mostly in time to do job

Little - Very hard to assess

Little - We have our own personnel doing deicing

Little - We normally use our own airline employees to deice

Little - Why does a Canadian major carrier identify "Type 1 - 100%" when in fact it is a mixture?

Little - Widest variation is delivery speed. Ideal is 2 truck application just before runway. On gate deice during freezing precip. is worthless

Little - With few exceptions, deice service provided by company personnel

None - Airline has one standardized procedure, any differences not noticeable

None - Commuter pilot - all stations use same service

None - Company procedures standardized

None - Compared to only 2 stations ever deiced

None - Have only been deiced at STL MCI JFK DTW

None - I don't deal with the "airport" for deicing. I deal with the Company

None - No international deice experience

None - Not with Northwest!

None - Only experience last 2 yrs - DTW, MSP, YYZ, BOS

None - The less experienced deice crews/services simply use a much greater amount of fluid per aircraft

None - They all do the job

None - United Airlines is standard everywhere I use deicing

None - Widebody pilot - major hubs/international gateways I do not see smaller stations

Inv. resp. - Only been to 2 airports DTW & MSP for icing

Inv. resp. - All anti-icing except for occasional frost etc. should be done as near the end of the runway as possible

Inv. resp. - All our deicing is done by company personnel

Inv. resp. - At almost all stations I fly into my company (UAL) does the deicing. It is consistently excellent

Inv. resp. - CDG

Inv. resp. - CHICAGO

Inv. resp. - Can't say

Inv. resp. - Cannot answer - only flying ORD-NRT

Inv. resp. - Car wash style at runway end preferred

Inv. resp. - Do not know

Inv. resp. - Done by company people

Inv. resp. - Fly mostly international routes - Asia

Inv. resp. - Have not been deiced/anti-iced in other than U.S.

Inv. resp. - I have been deiced at only 2 airports - no difference

Inv. resp. - I only use 1 airport in U.S.

Inv. resp. - Impossible to determine. Have to trust deicing crew is doing it right. Some crews may do it better i.e. removal over entire a/c, can't see

Inv. resp. - International pilot. I only operate out of 1 U.S. City

Inv. resp. - Little experience

Inv. resp. - Most experience is international

Inv. resp. - No comment because I only operate out of DTW

Inv. resp. - No opinion

Inv. resp. - Not all airports have Type II or IV

Inv. resp. - Not enough experience with different airports

Inv. resp. - Not sure, I work for a regional

Inv. resp. - Only been to limited number of Northern cities

Inv. resp. - Only operated at ORD

Inv. resp. - Our aircraft are always deiced by company employees. The procedure is rigidly standardized

Inv. resp. - Some airports only allow deicing at gate-with moderate or greater precip-it's nearly impossible to T/O without exceeding HOT when contamination criteria - deicing adjacent to runway departure end is optimal

Inv. resp. - The quality of deice at small airports varies greatly

Inv. resp. - This question does not make sense. My company provides the deicing, not the airport

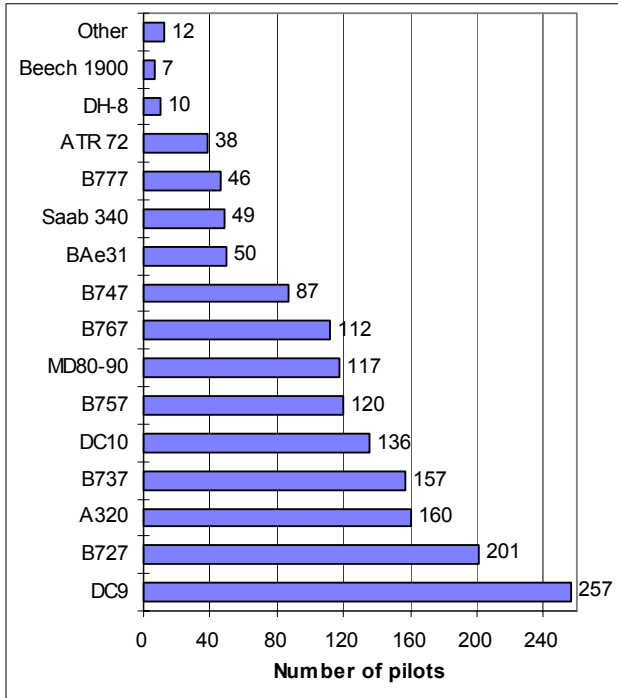
A4. (b) Give examples of several airports providing the best and worst de/anti-icing service:

WORST AIRPORTS		BEST AIRPORTS	
DETROIT (DTW)	76	DENVER (DIA)	298
CHICAGO O'HARE (ORD)	72	PITTSBURGH (PIT)	278
NEW YORK (LGA)	69	CHICAGO (ORD)	176
MINNEAPOLIS (MSP)	40	MINNEAPOLIS/ST.PAUL (MSP)	160
DENVER (DIA)	39	DETROIT (DTW)	117
NEW YORK (JFK)	37	ST. LOUIS (STL)	74
ST LOUIS/LAMBERT (STL)	36	TORONTO PEARSON	32
WHITE PLAINS (HPN)	25	MONTREAL-DORVAL (YUL)	25
MEMPHIS (MEM)	20	OTTAWA (YOW)	17
BOSTON (BOS)	20	PARIS (CDG)	11
NEWARK (EWR)	15	ANCHORAGE (ANC)	10
WASHINGTON NATL (DCA)	10	MEMPHIS (MEM)	5
CLEVELAND (CLE)	10	NEW YORK (LGA)	5
WASHINGTON DULLES (IAD)	9	BUFFALO (BUF)	4
OMAHA (OMA)	8	GRAND RAPIDS (GRR)	4
DALLS/FT. WORTH	8	KANSAS CITY (MCI)	4
SYRACUSE (SYR)	7	MOLINE (MLI)	4
PORTLAND (PDX)	7	NEW YORK (JFK)	4
KANSAS CITY (MCI)	7	SALT LAKE CITY (SLC)	4
CEDAR RAPIDS (CID)	7	SEATTLE/TACOMA (SEA)	4
SEATTLE/TACOMA (SEA)	6	BOSTON (BOS)	3
HARTFORD (BDL)	6	CINCINNATI (CVG)	3
BUFFALO (BUF)	6	DAYTON (DAY)	3
GRAND RAPIDS (GRR)	5	DES MOINES (DSM)	3
FLINT (FNT)	5	PHILADELPHIA (PHL)	3
CINCINNATI (CVG)	5	CLEVELAND (CLE)	2
TORONTO (YYZ)	4	DETROIT METRO	2
SOUTHERN AIRPORTS	4	HARTFORD (BDL)	2
SALT LAKE CITY (SLC)	4	LOUISVILLE (SDF)	2
QUINCY (UIN)	4	MUSKEGON (MKG)	2
PITTSBURGH (PIT)	4	NORTHERN AIRPORTS	2
FAYETTEVILLE (FYV)	4	NWA Hubs	2
BRADLEY INTERNATIONAL	4	SIOUX CITY	2
BALTIMORE (BWI)	4	SOUTH BEND (SBN)	2
VANCOUVER	3	SYRACUSE (SYR)	2
TULSA (TUL)	3	WASHINGTON DULLES	2
TRAVERSE CITY (TVC)	3	BENTON HARBOR (BEH)	1
RALEIGH/DURHAM (RDU)	3	BILLINGS (BIL)	1
PHILADELPHIA (PHL)	3	BRADLEY-HARTFORD	1
NORFOLK (ORF)	3	CALGARY (YYC)	1
INDIANAPOLIS (IND)	3	CANADA AIRPORTS	1
DES MOINES (DSM)	3	CEDAR RAPIDS (CID)	1
COLORADO SPRNGS (COS)	3	CHARLOTTE (CLT)	1
CHARLOTTE (CLT)	3	CHICAGO (MDW)	1
BLOOMINGTON (BMI)	3	EVANSVILLE (EVV)	1
ATLANTA (ATL)	3	FRANKFURT	1
ALLENTOWN (ABE)	3	GANDER	1
YOUNGSTOWN (YNG)	2	GREEN BAY (GRB)	1
ROCHESTER (ROC)	2	GREENWOOD (GRD)	1
RHINE LANDER	2	HOUSTON	1
RENO (RNO)	2	HUDSON GENERAL	1
PROVIDENCE (PVD)	2	INDIANNAPOLIS	1
MINOT (MOT)	2	LINCOLN (LNK)	1
MILWAUKEE (MKE)	2	MANISTEE (MBL)	1
MADISON (MSN)	2	PEORIA (PIA)	1
LUBBOCK (LBB)	2	ROCHESTER	1
LOUISVILLE (SDF)	2	SIOUX FALLS	1
LITTLE ROCK (LIT)	2	SPRINGFIELD (SPI)	1
KALAMAZOO (AZO)	2	TRAVERSE CITY	1
FORT WAYNE (FWA)	2	TWIN HILLS (TWA)	1
DUBUQUE (DBQ)	2	VANCOUVER (YVR)	1
DECATUR (DEC)	2	WATERLOO	1

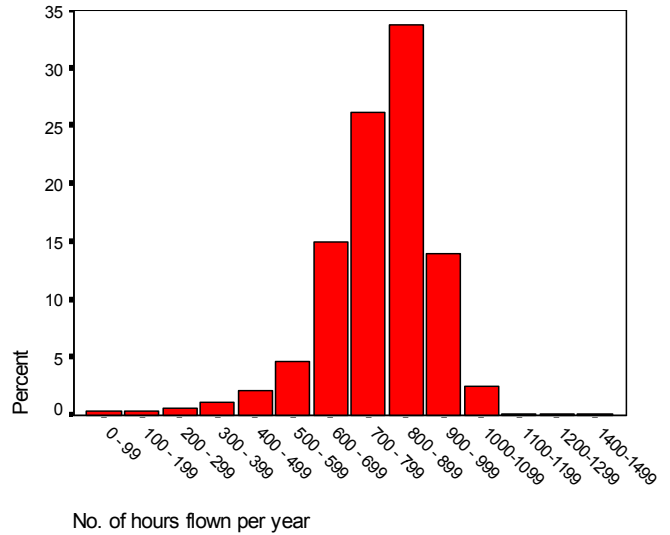
Another 53 airports were specified once under the providing the worst de/anti-icing service

B. PILOT EXPERIENCE

B1. Please indicate what aircraft type you currently fly?

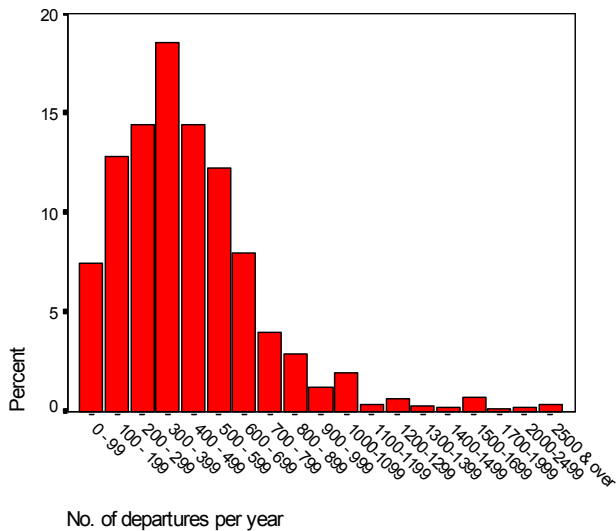


b) No. of hours flown per year

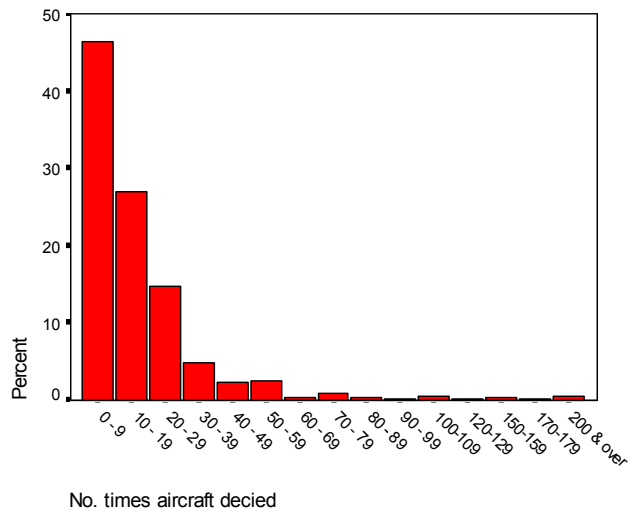


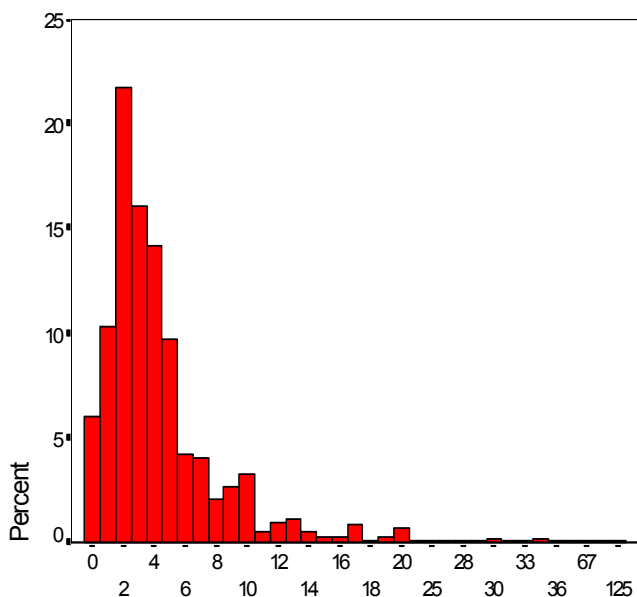
B2. How frequently do you fly:

(a) No. of departures per year

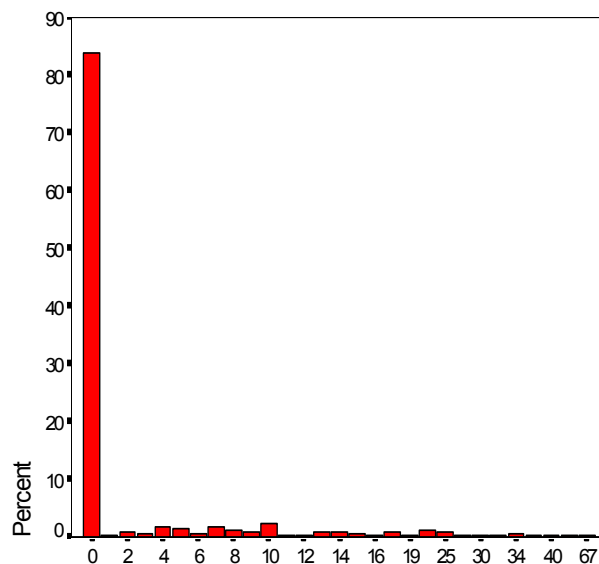


c) No. of times your aircraft was deiced during this winter:





% of departures where aircraft deiced

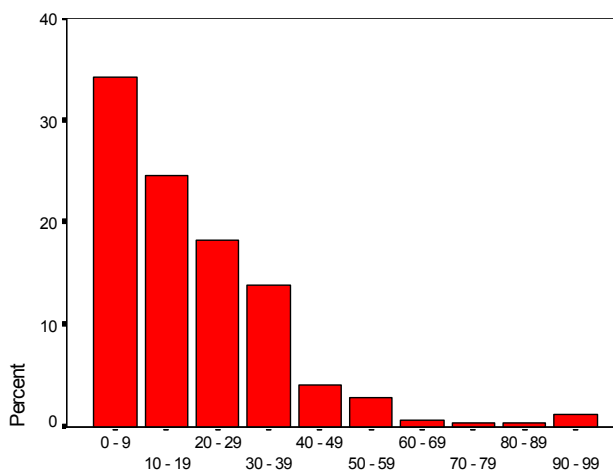


% of deicings where aircraft was re-deiced

d) No. of times your aircraft was re-deiced this winter

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0	1323	84.1	84.6	84.6
1	111	7.1	7.1	91.7
2	74	4.7	4.7	96.4
3	18	1.1	1.2	97.6
4	7	.4	.4	98.0
5	21	1.3	1.3	99.4
6	3	.2	.2	99.6
7	1	.1	.1	99.6
8	1	.1	.1	99.7
10	3	.2	.2	99.9
12	1	.1	.1	99.9
15	1	.1	.1	100.0
Total	1564	99.4	100.0	
Missing -1	10	.6		
Total	10	.6		
Total	1574	100.0		

B3. Approximately what percentage of your departures in the last year were made under near or sub-zero temperatures (OAT) ?

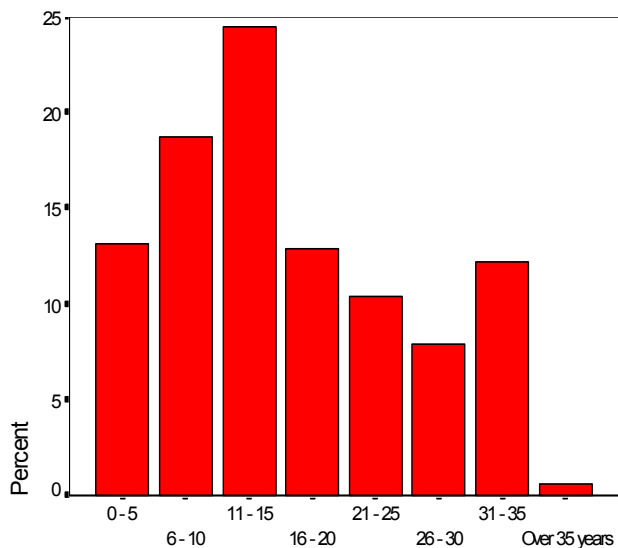


% of departures from near or sub-zero temps

Type of aircraft you currently fly		No. of departures per year	No. of hours flown per year	No. of times aircraft was deiced during this winter	No. of times aircraft was re-deiced this winter due to possible fluid failure	No. of years you have been an airline pilot	% of departures at sub zero temperatures (OAT)
B727	Mean	437.15	753.72	12.77	.32	14.62	16.22
	No.	168	196	201	201	201	201
B737	Mean	470.86	747.90	20.60	.34	11.39	19.37
	No.	134	157	157	155	157	157
B747	Mean	126.57	709.24	3.45	.12	20.74	13.66
	No.	83	86	87	86	87	87
B757	Mean	325.00	736.73	9.34	.12	15.85	14.67
	No.	104	120	120	119	120	120
B767	Mean	291.56	705.68	8.52	.14	18.82	14.78
	No.	97	111	112	112	112	112
B777	Mean	128.79	667.05	4.46	.22	21.30	19.17
	No.	43	44	46	46	46	46
DC9	Mean	547.58	758.22	17.92	.42	14.78	18.86
	No.	226	256	257	257	257	257
DC10	Mean	200.25	735.83	7.10	.20	20.35	14.17
	No.	117	132	136	136	136	136
MD80-90	Mean	359.95	740.04	11.19	7.76E-02	18.72	17.45
	No.	97	116	117	116	117	117
A300	Mean	150.00	833.33	32.67	.00	13.33	2.00
	No.	2	3	3	3	3	3
A320	Mean	321.31	713.91	9.25	.12	14.34	14.75
	No.	131	158	160	160	160	160
A340	Mean	600.00	800.00	100.00	10.00	12.00	40.00
	No.	1	1	1	1	1	1
BAe Jetstream	Mean	880.37	777.00	23.64	1.34	4.76	20.68
	No.	41	50	50	50	50	50
Saab 340	Mean	759.17	826.63	45.47	.91	5.20	21.78
	No.	36	49	49	46	49	49
ATR 42	Mean	775.00	750.00	12.00	.00	1.00	65.00
	No.	1	1	1	1	1	1
ATR 72	Mean	675.63	774.76	34.45	1.22	8.29	26.63
	No.	35	38	38	37	38	38
DH-8	Mean	832.78	848.00	94.50	2.50	6.40	25.10
	No.	9	10	10	10	10	10
Beech 1900	Mean	1117.86	1022.86	140.00	2.00	7.57	21.43
	No.	7	7	7	6	7	7
Other	Mean	482.57	792.50	19.38	.25	15.88	22.63
	No.	7	8	8	8	8	8
Total	Mean	407.99	743.32	15.22	.35	15.18	17.16
	No.	1339	1543	1560	1550	1560	1560

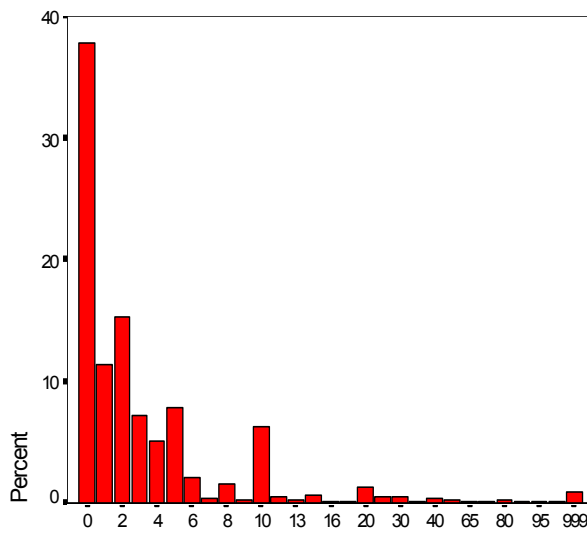
B4. How many years have you been:

a) An airline pilot?



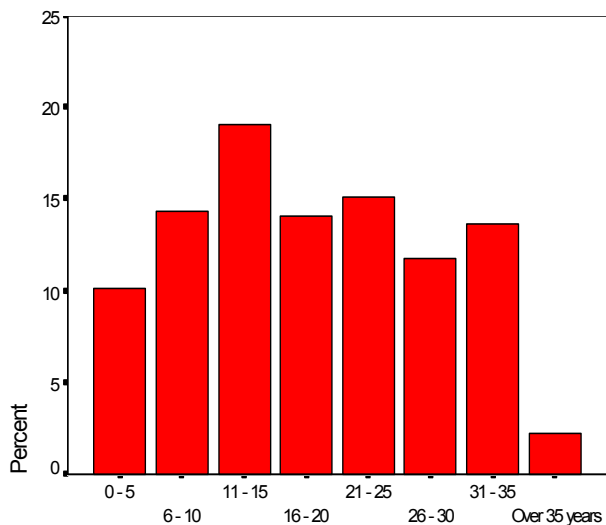
Nb. years an airline pilot

expire during conditions of precipitation before takeoff could be initiated:



Last 2 winters, how many times did HOT expire during precipitation

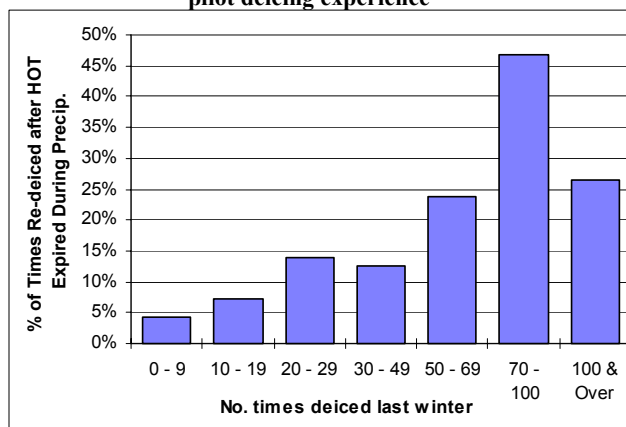
b) Operating in areas subject to ground icing?



Nb. years operating in ground icing areas

b) Of those times in (a), how many times did you have to re-deice?

Variation in percentage of times that aircraft was re-deiced after HOT expired during precipitation with pilot deicing experience

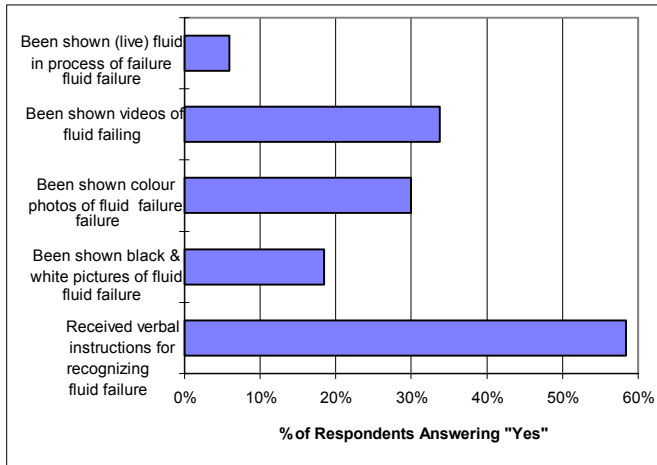


Average over all pilots = 8.4%

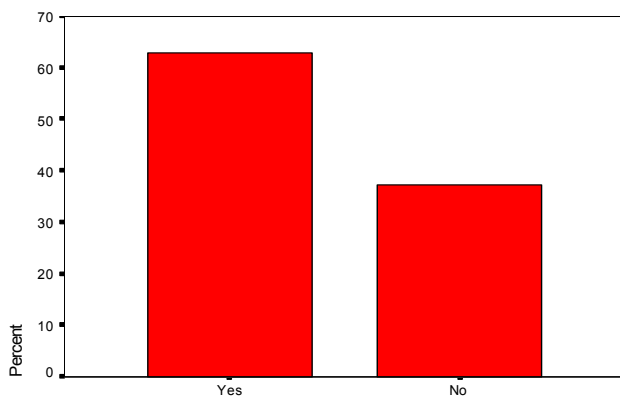
B5 a) During the past two winter seasons, how many times did your holdover time

C. CONFIDENCE

C1. During your training for aircraft ground deicing/anti-icing procedures, have you:



C2. Was your training on ground deicing fully satisfactory?



Was your training on ground deicing fully satisfactory?

[Invalid responses: 37 (2%)]

Response to prompt: *If no, please suggest improvements:*

- No - 1) Better training of ground crews. 2) Instruction in fluid failure. 3) Reconcile many small differences between GOM & real world procedures used on line
- No - A cursory review by company is all that was accomplished. Enough for company and FAA to check their blocks
- No - A good video would help
- No - A video of the procedures used and possible problems of various deicing scenarios would help pilot understand & deal with deicing situations

- No - A video showing exactly what to look for fluid failure - We still operate using the "clean wing" concept. In my case, the past winter was minimal in need for deice procedure
- No - A video tape thoroughly explaining what deicing/anti-icing is, types of fluids with pictures, fluid failure clues, examples, along with airline specific policy and procedures, and differences in fluids
- No - A video would work
- No - Above mentioned videos and pictures would be helpful
- No - Absolutely NO contact with a qualified expert on deicing. NO ability to clarify procedures or provide input for improvement. TOTAL video training!
- No - Actual real life video of Type II & IV & action under actual heavy snow conditions
- No - After 30 years of flying, have learned my comfort levels of various situations. I can affirm that extra training & help is always welcomed and appreciated!
- No - All I did was complete a test for my training. I wish there was a better training especially in the use of Type IV
- No - All I've had has been written materials. I feel OK, but the visual is worth many words
- No - All guidance is written - no visual/video - and it's not of much use
- No - All instructions/descriptions are given in text form. Not by pictures or videos
- No - All of the above would be very helpful (X 3 responses)
- No - All pilots need to be shown live fluid failure, even a video doesn't work well enough
- No - All stations need to standardize their procedures
- No - All the above in C1
- No - All the above would be beneficial
- No - All training my company does is too fast - too quick
- No - All training was via publications sent to me. Company does not want to spend money to train adequately. That includes ground personnel, based on the non-standardization of individual stations
- No - All visual checks of wing for cleanliness must be made from cabin and mandatory film showing fluid - clean when saturated
- No - All we have for training and/or reference is a section of verbiage in the flt ops manual and a do-it-yourself video tape
- No - All we have is what is written in our operating manual & a winter weather packet distributed by our training dept. Tells us the obvious "Don't takeoff with any portion of the a/c contaminated". No training
- No - All we received was a hand out to include in our ADM Vol. 1. One day TYPE 4 showed up for use with no pilot training. Only e-mail and ADM revisions
- No - Almost a yes - would like to see/read about more info on the shearing which takes place on T/O roll and if fluid has any effect on lift/stall characteristics? AIs, more info of hot vs cold application, 50
- No - Almost none at TWA only bulletins
- No - Always learn more
- No - An excellent color video or actual line experience

- No - Ans. based on question C1, other training on subject I feel is sat.
- No - Any of the instruction referred to in question C1
- No - Any of the items in question C1 would have been nice
- No - Anything would be better than nothing
- No - Apparently not
- No - Apparently not based on questions in C1 above
- No - At our company the only winter training is a memo or written test & info
- No - Back to Type II/IV fluids - If principle is based on shearing, does fluid also absorb snow- should still work with snow visible on top of fluid surface, as long as water content through absorption has no
- No - Based on C1, I would like to have seen videos/examples of fluid failure
- No - Based on question C1, I would like a better explanation/visual training
- No - Based on question C1, more visual material showing fluid failure
- No - Be able to answer Yes to C1
- No - Be more specific with fewer contradictions
- No - Better courseware to provide real world clues would be far superior to current B.S. solution to problem is not better training to recognize a failing situation, but rather engineering a less failure-pron
- No - Better recognition of fluid failure
- No - Better training about fluid failure
- No - Better training on holdover times and their meaning. How long does the fluid really last? Ground personnel need better training. HOT is for FZRA
- No - Better videos of fluid failure
- No - Bulletins alone have limited value
- No - C1 above. Training containing pictures like this would be very valuable
- No - C1 outlined every deficient area. The tapes don't exist at my carrier - every piece of info is printed and there are no pictures
- No - Central deicing location
- No - Charts on holdover times and description of types I, II, IV are about it. Also general training on performance degradation with ice on wings
- No - Classroom instruction & videos
- No - Clearly lacking training on fluid failure. Could use info on fluid dynamics
- No - Communication procedures between ground & cockpit were weak at times & required further standardization. Eventually these procedures did improve, however
- No - Company policy regarding deicing was changed/revised several times with no revision to SOP
- No - Company should do some of the things mentioned in question C1 for starters
- No - Conflict exist between ground crew and when deicing is needed or not needed. The word adhering to flight surface is not used as the need for having the aircraft deiced
- No - Could have had more pictures of fluid failure
- No - Considering the answers to C1 - would like to have had some/all of that training if it's available
- No - Consistent implementation of our program needs to be adhered to
- No - Could use info from C1
- No - Course should include visual aids on various stages of fluid condition
- No - Cover what is necessary to meet regulation. But practical items such as "fluid failure" are not covered. We are told if you don't like what you see turn back to the gate (common sense)
- No - Deice training is conducted via a handout and attached quiz
- No - Demonstrate "fluid failure"
- No - Demonstrations in previous question would be great
- No - Despite good verbal and written description, I would prefer video
- No - Did not get any training. All what we get every winter is a handout
- No - Did not have a video of the procedure or anything in the above question C1
- No - Discussion and visual presentation of visual cues would have been very helpful. Our training consisted of reading a training handout discussing the procedures and dangers of a/c icing
- No - Does not address fluid failure
- No - Does not include items from C1 above which would be helpful
- No - EXCESSIVE. Referencing above, we could have had MORE on fluid failure
- No - Everything is done by bulletins no classroom training
- No - Evidently not
- No - Explain fluid failure
- No - Exposure to all contained in C1 above!
- No - Extent of training is via updates to general ops manual - that's all - there are no videos, pictures or discussions
- No - Cover items in C1
- No - Failure examples would have been helpful. Also, holdover times only paid lip service to
- No - Filling a square, mostly. Written material is fair. Since we must see the problem, why not make a standard film (can't companies collaborate) and show us these features. Picture worth one thousand words.
- No - Find a way to show us actual failure, in differing degrees, under different lighting conditions
- No - First I thought it was a good training but since I saw this questionnaire I feel like I missed out on the failure of fluid subject
- No - Fluid failure demonstration would be nice
- No - Fluid failure examples video/pictures
- No - Fluid failure is not recognized by most of our pilots
- No - Fluid failure needs to be stressed more
- No - Fluid failure not adequately discussed. We are just told to look for ice/snow accumulation. Perhaps this is because we only use Type I for deicing
- No - For starters use question C1 as a guide and require it to be reviewed during every single visit training
- No - For the reasons listed in C1 above
- No - From the questions above (C1) photos and videos might have enhanced the training
- No - Get new job because the rinky dink outfit I fly for will never do more than they have too
- No - Give me useable video of fluid failure example
- No - Good but not great; suggestion: demo (actual) or video of deice and subsequent failure

- No - Good videos may be helpful
- No - Greater emphasis on different fluids and their physical characteristics and properties
- No - Ground school
- No - Guess not
- No - Hands on experience would go a long way to improve my knowledge of fluid failure
- No - Have "approved" training including all the above
- No - Help in evaluation from window prior to T/O
- No - How do you recognize fluid failure?
- No - How to achieve ATC priority for departure when holdover time is short
- No - How to recognize fluid failure
- No - How to recognize fluid failure
- No - I can't remember any one video of "fluid failure"
- No - I can't remember seeing anything on "fluid failure" specifically; but I think I could recognize ice or snow starting to accumulation on an airframe
- No - I do not know how to recognize fluid failure. HOT are the only method and I do not completely trust the tables. Also visually looking out the cabin windows is not a good measure of buildup on fluid failure
- No - I don't believe bulletins suffice. Visual as well as tactile training should be required
- No - I don't believe our company has any videos on any of the subjects above. We take a take-home multiple choice test on company regulations pertaining to deicing once a year. It seems like more of a CYA thin
- No - I don't recall any of the above being used. That would be nice to have that kind of instruction if those teaching aids are available
- No - I encounter varying STANDARDS among Captains with regard to deicing procedures when conditions are minimal/borderline
- No - I feel visual aids should be incorporated into the training program to illustrate fluid failure
- No - I guess I am not fully clear on how to recognize fluid failure
- No - I guess I need info on fluid failure
- No - I guess I need to see some info on fluid failure
- No - I guess no after reading question
- No - I guess not, if the pictures & videos described in question C1 (above) exist
- No - I guess we need fluid failure recognition training (not just time4 limits) holdover charts)
- No - I have repeatedly requested that a warning re: Type I Glycol be given to employees due to an experience I had in "Commuter" flying. Being sprayed & getting wet with deice fluid can be absorbed through ski
- No - I received good training with the exception of the above mentioned (C1)
- No - I thought it was okay before answering no 4 times above
- No - I received no instruction on fluid failure
- No - I remember seeing some good pictures in the Boeing Airliner Magazine some years ago - the best stuff I have seen
- No - I thought it was satisfactory until answering question C1. Pictures would help in the training greatly
- No - I thought so until question C1
- No - I would have liked some pictures of what fluid failure really looked like
- No - I would have liked to have seen a video on the effects of fluid failure
- No - I would have liked to have seen at least photos of fluid failure
- No - I would have liked to see those pictures and videos
- No - I would have said yes until idea of actual photos was brought up
- No - I would like to be shown fluid failure - Time lapse - and under differing precipitation levels & types
- No - I would like to see fluid failure via training. I have only read about it in bulletins
- No - I would like to see pictures or videos of fluid failure
- No - I would like to see the pictures referred to in C1 above
- No - I would like to see video of fluid failure
- No - I'd love videos & physically seeing/feeling/touching if possible. Also more explanation of the science/physics/chemistry at work
- No - I'm not real comfortable with the visual question for recognizing fluid failure. This is partly due to luck in the type of WX conditions I've had to fly in
- No - I'm not sure how to recognize fluid failure
- No - If we need to be this extreme about deicing then all of the items in C1 should be available
- No - If you call self study from FDM and flight manuals satisfactory - then OK
- No - Improve the visual aids to identify fluid failure
- No - Improved videos would help
- No - Include all items in C1 above
- No - Include any of the above "no's"
- No - Include the C-1 items in recurrent training
- No - Include videos demonstrating fluid failures
- No - Increase training on "fluid failure"
- No - Industry is operating scared so we deice at all times sometime it is not needed
- No - Industry needs to share info
- No - Info on fluid failure
- No - Initial training needs improvement, most airline pilots come to a regional never having SEEN any form of ice
- No - It should include useable methods of determining fluid failure
- No - It was excessive and still did not cover fluid failure
- No - It was written package only, no video, photos, etc.
- No - It would be good to see and feel the fluids up close and note how they change with moisture absorption
- No - It would be helpful to see pictures or videos of fluid failure, but we can't see the top of the wing anyway
- No - It would be nice to actually see fluid failing on a wing from a point in the cabin
- No - It would be nice to get a lecture or a seminar. They just give us a packet and say read it. We have never been told about fluid failure
- No - It's hard when you have no other training to compare to, however it seems as though on "Weather days" everyone is walking around in a state of confusion on appropriate procedures to follow
- No - Item C1 above
- No - Just need more in-depth on procedure
- No - Lack of training on recognizing fluid failure

- No - Less time on security & more emphasis on videos - etc. as indicated in C1. FAR 121 recurrent training is an excellent opportunity
- No - Like to see what fluid failure looks like
- No - Live demo's
- No - Live fluid failure demos (survey makes one think that this training is possible and/or practical) would be helpful
- No - Live or good video of actual would be better. Better standardization of airports & ground crews
- No - Mainly in written form not much was over mentioned in ground school
- No - Make it an annual training event not just for pilots going to recurrent training in winter months
- No - Marginal, no video/computer based at recurrent. Just bulletins and flight handbook info. Need pictures/videos of fluid breakdown
- No - Material must be read on own out of FOM. Verbal instructions on procedures that must be done but not on what you are looking for
- No - Minimum amount of training given in recurrent ground school more needs to be done (i.e. items C1 above) fluid failure is not even discussed in class, only holdover time
- No - More deicing scenarios during sim. training
- No - More emphasis during your annual training
- No - More emphasis needs to be put on proper deicing/anti-icing at some carriers
- No - More emphasis on examples of and determination of fluid failure
- No - More emphasis should be given to returning to the gate if necessary & the fact that at times it is necessary regardless of schedules, slots lost or passengers being upset for after all it is the Captain'
- No - More emphasis should be placed on what to look for during visual inspections for signs of fluid failure (i.e. fluid foaming could also appear to be a sign of fluid failure (snow" on wing)
- No - More examples (visuals) needed. What is OK-ex. we saw snow sticking b/t vertical stabilizer and engine pad on a/c ahead of us (contamination - our wings were visually clean, but we did know if our tail w
- No - More examples needed of fluid failure
- No - More guidance on how to recognize fluid failure and what would constitute representative fluid failure and what would constitute representative surfaces for my aircraft type would be welcome, e.g., a good
- No - More hands on live
- No - More illustrations of what to look for
- No - More info needed on fluid failure
- No - More info on fluid failure
- No - More information on improper deicing - what it looks like
- No - More information on procedure & application, fluid type description
- No - More information/visual presentation of actual fluid failures would be very helpful
- No - More instruction on the inexactness of holdover times
- No - More on fluid failure for each type a/c and how to tell for that a/c
- No - More operational consideration inputs from instructors as well as effective visual training aids like those mentioned above - not just regurgitation of regs/company policy
- No - More photos as suggested above
- No - More photos or examples of fluid failing. More stress on importance of holdover times
- No - More training concerning C1 above!
- No - More training in how to best determine if contamination is present
- No - More training or fluid failure
- No - More updated materials were needed. We probably looked at slides made in the early 70's
- No - More video/photos
- No - More videos - have training (ART) with deicers
- No - More videos on deice procedures/fluid failure
- No - More videos or color photos of fluid failing
- No - More videos/situational training
- No - More visual aids ESPECIALLY for a/c that I am currently flying
- No - More visual aids as to what one is looking for
- No - More visual instruction (as evidenced above)
- No - Must first have ground deicing training before it can be judged. We did however get memos in our mailboxes (typical)
- No - Must not have been showed. I don't recall seeing pictures of the above
- No - My company doesn't pay6 for training due to concessionary contract. Should have 2 hour block with photos, videos
- No - My pilot group could start an information campaign to help us ID fluid failure
- No - My training consisted of reading company deicing procedures in a/c manual. Pictures or videos would greatly improve ability to spot same
- No - Need better procedures to detect clear icing
- No - Need clear/concise pictures of fluid failure during different conditions (day-night, light dry snow to heavy wet snow & freezing rain)
- No - Need further training and understanding of failure and how to recognize it
- No - Need more aircraft specific information for the 757
- No - Need more detailed training & videos
- No - Need more emphasis on quick T/O after deice
- No - Need more information on recognizing fluid failure
- No - Need more modern videos & instructors who are more dedicated/enthusiastic about subject
- No - Need more of the info referred to in C1
- No - Need more than just a Memo explaining deice procedures
- No - Need more than just a slide show
- No - Need more training on fluid failure. Also airport specific (deice procedures, locations, fluid types). Our new hires are lost half the time!
- No - Need more video at A.R.T.
- No - Need pictures
- No - Need pictures, fluid failure new concept
- No - Need see first hand how fluid failed. Pilot cannot check failure without physical check of wing surface. Make airlines provide someone at takeoff runway who physically check wing surfaces. Military always d

- No - Need something more than perfunctory. Training is bare minimum
- No - Need to be shown videos and pictures of fluid failure
- No - Need to be trained to recognize fluid failure, need to know more representative surfaces from my aircraft
- No - Need to cover fluid failure
- No - Need to improve training on recognition of fluid failure. VERY LITTLE time is spent on this at UAL
- No - Need to see fluid failure for recognition
- No - Need to understand fluid failure better
- No - Need video or pictures of fluid failure
- No - Need visual aids
- No - Needs to be some sort of demonstration in laboratory or classroom
- No - Needs to be updated to reflect latest improvements and procedures
- No - Never even heard the term "fluid failure"
- No - Never heard of term fluid failure or how to recognize it
- No - Never mentioned fluid failure characteristics
- No - Never received conclusive evidence of what is acceptable or unacceptable fluid decay
- No - Never talked about fluid failure
- No - Never was it explained that if the snow is cold and dry, & not adhering, you don't need to deice. Also no instruction was given to teach inexperienced pilots how to determine if your airplane was contaminated.
- No - No according to C1 above. Was a handout and class discussion
- No - No discussion of chart usage or interpretation of interpreting HOT ranges or that of fluid failure
- No - No failure disclosure
- No - No films, no pictures, no hands on experience. Discussion of procedures only.
- No - No fluid failure examples
- No - No holdover time for heavy precip but heavy is defined as visibility less than 1/4 mile-Procedures don't meet needs-we have deice at gate & remote deice procedures-we often push off the gate and then deice
- No - No one ever tells you how you're supposed to see out a window covered with precipitation
- No - No pictures of above ever available for viewing. Video tape during recurrent GSO would be nice
- No - No practical actual conditions used
- No - No real training
- No - No training - only written bulletins
- No - No training done. Only letters, notices and bulletins
- No - No training on fluid failure
- No - No training on recognizing fluid failure
- No - No training per se, just info in flight manual and ops manual, a video
- No - No training that I recall whatsoever - Other than some handouts, etc.
- No - No video or pictures, just an oral briefing on deice procedures
- No - Not complete
- No - Not enough information is presented concerning fluid failure, or conditions leading up to IT. Again, too many variations of conditions exist. Deicing procedures can only truly be effective if a/c are deiced
- No - Not good enough in recognizing fluid failure
- No - Not much is done as ground training except during line ops & in FOM (reading) videos etc. would be nice
- No - Not really
- No - Not sure why fuselage needs total deicing
- No - Nothing about fluid failure was in my training; training consisted of what is written in our FOM; concentrating on holdover times and types of fluids
- No - Nothing but a chart and a bulletin describing the chart were provided. Anything, videos, etc. would be an improvement
- No - Nothing on fluid failure
- No - Nothing on how to recognize fluid failure
- No - Now that you bring it up, some videos would be helpful
- No - Obviously I haven't been trained to recognize fluid failure
- No - Obviously need more visuals on fluid failure
- No - Obviously not from C1
- No - Obviously, I have never seen pictures or anything relating to the process of fluid failure, other than accumulations of snow on the surfaces deiced
- No - Obviously, I need training on fluid failure
- No - Obviously, no because of no exposure to fluid failure recognition
- No - Obviously, visual recognition of fluid failure is missing from our deice training
- No - Only a short film - could have been more in-depth for new guy like me
- No - Only in the respect that we never mentioned fluid failure in class
- No - Only received bulletins - need training as noted in C1 above
- No - Ops manual is not well written when it comes to borderline scenarios (type of precip and fluid usage). Every year the same questions keep coming up
- No - Other than concerning fluid failure it was OK
- No - Our airline uses a home-study pages, no videos, no pictures. Just text
- No - Our company just issues a written book with a test to be turned in
- No - Our company needs to provide a video presentation to show the process. As an F/O-the company feels you'll learn on-line. As a Captain they think you were exposed to the operation as an F/O. Also for convenience
- No - Our company simply hands out a pocket with an open book quiz attached
- No - Our training videos are at least 20 years old
- No - Our winter ops training is a pamphlet handed out prior to November with a quiz at the end of it. Not satisfactory in my opinion
- No - Perhaps a video showing fluid failure and more nighttime guidance would help
- No - Perhaps pictures of video fluid failures would help recognize problems
- No - Personal health hazards about vapors
- No - Photo's and/or videos - Test results videos
- No - Photos of fluid failure
- No - Photos/film of what to observe rather than visual descriptions of fluid characteristics/failure

- No - Pictures (day & night) would be helpful (both for Type I and II and IV). Recognition of fluid failure is too vague
- No - Pictures in training would have been good. Have only seen drawings and written descriptions of failures
- No - Pictures of fluid failure in our manuals, and in the annual deicing/anti-icing procedures booklet we receive each year
- No - Pictures or actual demos of fluid failure would be extremely helpful
- No - Pictures/video mentioned above would be nice
- No - Pilots must understand that HOT's are hard times. The fluid will not protect the a/c, when these are exceeded and takeoff is at the pilots own RISK. 999 times of 1000 the takeoff will be made without incident
- No - Pilots need to be trained to understand how the fluid works and the differences between fluids not just what the process of being deice should be
- No - Please do all of the above!
- No - Plenty of info on HOW to deice. Little info on the mechanics of how/why deicing works
- No - Presently, we only have a video that shows & describes fluid failure. Also, there is a description in our ops manual. It would be helpful to have an instructor describe failure in more detail during recurrent training
- No - Procedure not meant to give least amount of delay between deice and takeoff
- No - Procedures are almost too inflexible. The crew can't ask for "spot" deicing, and the crew is never told what the ground crew sees as they deice. So perhaps good overall communication is lacking. Maybe it
- No - Procedures still require impractical actions from cover to cover management's behind
- No - Procedures were good. Fluid failure not discussed
- No - Prove pictures of fluid failures
- No - Provide info in C1
- No - Providing a realistic video/slides presented by an "experienced" individual giving practical suggestions on how to handle different situations related to ground icing
- No - Real "hands on" would be helpful videos are getting better
- No - Real instructors not MSP videos
- No - Recognizing ice on wing
- No - Recurrent training needs more review for deicing procedures
- No - Recurrent training should be used for things like this instead of wasting it looking at useless films of what a bomb is and discussing CRM issues that do not amount to anything and won't be changed anyway
- No - Refer to C1 above and note all of the "No" answers
- No - Reference C1 above - all "NO"
- No - Reference above question, would like to know more about fluid failure and visual contamination checks from cockpit and/or cabin
- No - Regarding the above question my impression was that when holdover time expired you re-deice unless a visual inspection proves that it is not needed, but how do I know what to look for?
- No - Req. more info on fluid failure thru video/DIC, etc.
- No - Require superb quality video(s) for training showing before, during & after failure as a minimum
- No - Required ground instruction
- No - Research indicates Type I fails very quickly. Training should stress this & encourage use of best fluid available. HOT should not be exceeded without re-deicing if condition that created need to deice in the
- No - Review & demonstrate fluid failure (pictures/video). Review Type II & IV fluid characteristics
- No - Review aircraft specific icing conditions procedures prior to the onset of winter, i.e. late summer or early fall
- No - Revise guidance to be more nearly unambiguous. Provide training in recognizing perilous icing conditions and fluid failure
- No - Recurrent training in C1 items. We RX lots of written articles about deicing & how to perform clear ice checks, but not much else
- No - Satisfactory except for C1
- No - See "NO" responses above
- No - See C1 (answered "No" to each question on training for recognizing fluid failure) (**X 23 responses**)
- No - See C1, our training consisted of a written training handout, no picture or video
- No - Seeing the above (C1) pictures would have been helpful, but that did not happen
- No - Should be better presentations to see all the situations asked about above
- No - Should give better training on how to recognize fluid failure
- No - Should have a recurrent tape on de-ice to be kept at pilots home. Like aviation WX tape. Watch when winter season for deicing begins
- No - Should have been shown videos of fluid failure
- No - Should have had photos or video of fluid failure
- No - Should have had some of the above training
- No - Should have received photos and/or videos of failures. However I have extensive experience in earlier flying of CV580 and DC-9 through Midwest
- No - Should include good quality photos or preferably actual fluid failure. Should include explanation of aerodynamic effects of ice and review of icing accidents
- No - Should see more info on fluid failure
- No - Show actual example!
- No - Show actual footage of fluid failure
- No - Show me live fluid in process of failure. That would help.
- No - Show me the pictures
- No - Show pictures & videos
- No - Show pictures of failed fluid
- No - Show pictures of fluid failure - explain what to look for when looking from the airplane out over the wing
- No - Show the above videos
- No - Show videos, pictures, instructions during recurrent ground school
- No - Simply going over the whole process
- No - Since I answered "NO" to all questions (C1) obviously my training has not been satisfactory
- No - Some of the terms our airline uses are confusing and the variety of checklists we must go through

- No - Some training to recognize fluid failure would seem appropriate
- No - Somehow a pamphlet does not seem to cut it
- No - Standardize procedure by always having aircraft deiced on both sides at the same time
- No - Subject was touched on lightly with home reading material
- No - Teach the procedures in a more a/c specific form. Emphasize the details of what to look for on YOUR a/c
- No - Text descriptions of fluid failure are not satisfactory
- No - The above items would be nice!
- No - The above video or verbal instruction would clarify the effects of icing in regard to deicing
- No - The chevrons on the wing root of the DC9 - not sure what to look for
- No - The current holdover time flow charts in use are very cumbersome and confusing
- No - The fluid fail info above would have been great
- No - The last two items in C1 would help
- No - The only guidelines for fluid failure are holdover times as per chart
- No - The only training addressing fluid failure is a few paragraphs in operations manuals
- No - The only training we have received is what is written in our FOM. (Flight Operations Manual)
- No - The only way to really show fluid failure is to get outside and see for yourself what it looks like under actual conditions
- No - The responses to C1 answers that question. I'll be checking with our training dept. about fluid failure training
- No - The training was just a few hours ground school. I am an instructor and I would like to see training associated with icing to last two to three days. The first time that I had to deice was quite a learning exp.
- No - The use of photo's & videos would enhance training
- No - The winter operations manual was fully satisfactory. However I received no verbal instruction on recognizing fluid failure for the 1997/1998 season. I would like to see pictures with videos and live fluid
- No - Theory on how the fluid works to prevent precipitation from adhering to the a/c i.e. what happens when snow falls on the wing
- No - There are still too many variables
- No - There has been no mention of fluid failure
- No - There is a need to feel, smell, and see each fluid during training. Many times on walk around it has been mistaken for hydraulic fluid
- No - These could be added to the training
- No - They (airlines) only do what FAA mandate because more than that is not required & it costs them money. Unfortunately safety = money spent
- No - This is the first time I have heard of "fluid failure"
- No - This is the first time I have heard the term "fluid failure". Otherwise training has been satisfactory
- No - This questionnaire suggests that I am very ignorant of the latest and greatest in the science of de-anti-icing
- No - This term "fluid failure" is new to me. I am aware of the issue but have not yet heard it in that term
- No - To expect me to visually determine whether the fluid has failed from an interior inspection of wing at night viewing through a cabin window is impossible
- No - To say satisfactory would mean a few hours of training in above mentioned procedures which I have not had. All of my training has been by experience on the line
- No - Too much emphasis on holdover times & not enough on recognizing fluid failure
- No - Too much self-study, no dedicated ground training!
- No - Train me - don't just disregard it because it doesn't happen all that often
- No - Training concerning fluid failure, what to look for, etc.
- No - Training consists of mostly technical writing, no pictures, hands on, manual is referenced in 3 different areas for deicing. A lot of gray area in regards to holdover times
- No - Training in items mentioned in C1
- No - Training is almost non-existent "OJT"
- No - Training on fluid failure
- No - Training only a take home open book test on procedures. Should include signs of fluid failure & incorporate all of above ideas
- No - Training primarily via memos. Perhaps videos would be more effective (for ground personnel also)
- No - Training should include some discussion on the chemistry involved & visual detection of fluid failure
- No - Training using the aids described above
- No - Training was OK, but no photos of fluid failing only application and fluid blowing back on takeoff roll to show characteristics. Good photos of fluid before and after failure would be a big plus
- No - Training was very good but there are numerous variables and situations that are not fully recognizable
- No - Ultra was never explained. See a/c return to deicing with no precipitation administrative exercise
- No - Unless you ask, information about ground deicing is usually not passed on. Need more real-time instruction
- No - Unsure of what IS a SAFE WING in deicing conditions
- No - Up till now I thought it was adequate. It would be helpful to see actual problems with holdover times exceeded and fluid failure
- No - Use of better visual aids
- No - Use of the above training aids, the NWA program is a joke - a handout with text & diagrams. Who approved that?
- No - Use the above stated examples
- No - Use video
- No - Very basic training during initial training i.e. "don't depart with ice, etc. adhering to the a/c". Also, our procedures seem to change each winter with no notice
- No - Very little training at all
- No - Video or actual fluid failure demonstrations would be appreciated
- No - Video or pictorial examples of fluid failure should be required
- No - Video tape and actual hands on lab to indicate just what is NO-GO situation. No one knows when fluid has failed!! They just guess

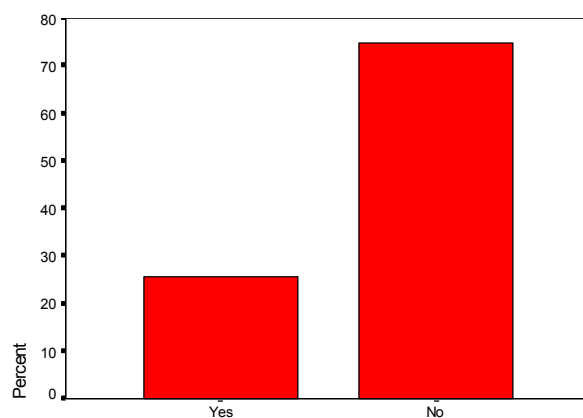
- No - Video tape incomplete and inaccurate - did such things as call "warm" snow (wet snow) "heavy" snow. "Heavy snow" is supposed to mean a rapid precipitation rate, not a quality/characteristic description
- No - Video would have been helpful
- No - Video/photos of fluid failure. Maybe a course that teaches how to recognize fluid failure
- No - Video/pictures of fluid failure would help greatly
- No - Videos (color) of what to look for, on each aircraft type from the pilots view
- No - Videos etc. showing failing fluid
- No - Videos of fluid failing
- No - Videos of fluid failure - emphasis on night observation vs day observation
- No - Videos showing actual fluid failure
- No - Videos showing failure of deicing fluid on an a/c
- No - Videos showing failures
- No - Videos would be helpful. Much like those published by B.F. Goodrich for wing deice boots
- No - Virtually non-existent possibly develop a program
- No - Visual instruction & narratives never achieve professional quality. Furthermore, video & soundtracks deteriorate with usable and are never (or so it seems) upgraded or replaced on a regular basis
- No - Visual photos would be helpful but from a pilot's perspective; inside the cabin looking through a small window on a dimly light surface at night
- No - Visual training of fluid failure
- No - Visually looking at wings a nice idea but I don't think the clues to detect failure are a good assurance, I do it for the FAA, I, however, am conservative by never exceeding holdovers, getting deiced when HOT exceeded
- No - Was not given adequate guidance to determine best cabin windows to look thru in order to check wing
- No - Watching a time-lapse type video of different types of fluids and precipitation/conditions with a pause at critical times i.e. beginning, failure stages, would be great
- No - We have no. just bulletins with HOTs. Pictures, as in C1, would be great. A simple 20 minutes during SVT/CQT, with a slide tray & discussion on Type I, II, & IV properties, would help a lot
- No - We need more training in recognition of fluid failure
- No - We received a brochure with written explanations on how and why to deice. Fluid failure was only defined but never demonstrated or explained
- No - Well, I'm beginning to wonder based on question C1 above, if I got trained in fluid failure
- No - Well, section C1, there was no recognition type training for fluid failure. You never really have a chance to see because normally it moves fairly quickly
- No - What about videos on recognizing fluid failure? SVT, AQP, or Recurrent
- No - Without a high quality video/computer training program that is provided just prior to the winter, knowledge learned in March is worthless by December
- No - Would be nice to have actual demos of failure or at least a good video
- No - Would have been nice to see more of items above in C1
- No - Would have been nice to view fluid failure videos, and have training determining changing extent of meteorological conditions
- No - Would have like more training on actual look to failed fluid
- No - Would like examples of when Type IV is still acceptable even though it appears to be questionable
- No - Would like information on deice crew training
- No - Would like more training in recognizing conditions which could decrease holdover times
- No - Would like to see color photos of fluid failure before and soon after
- No - Would like to see items in question C1
- No - Would like to see more info about effect of temperature on different fluid types & how to recognize fluid failure
- No - Would like to see more on fluid failure
- No - Would like to see some of the certification videos of a/c accumulating on the ground & in the air
- No - Would like to see something about the aforementioned fluid failure
- No - Would like video/photos as listed in C1 above
- No - Written handout was all that was given with test. Need lecture and Boeing video
- No - Written test-administered in December after deicing has already occurred in my areas. I have switched a/c and was never told what the new a/c icing tendencies were. Same test for all a/c flown at my company
- No - You can always learn more. Your term fluid failure is new to me. In the past we talked about precipitation accumulation
- No - You mention video & pictures is the previous question, that would be nice
- No - Your questions in C1 make a good point. It would be very helpful to have videos and/or pictures of fluid failure
- Yes - Actual a/c/WX conditions & observing
- Yes - All in video format
- Yes - Annual video of company and related ALPA articles are very adequate
- Yes - Because every airport has a different organization and setup for deicing training has to be kept general
- Yes - Best a live demo would be useful
- Yes - But I come from a very "hands-on" background - air taxi in the Northeast US
- Yes - But I would like to see materials on fluid failure
- Yes - But I'm not visual inspection for fluid failure is fool proof, night or day
- Yes - But above mentioned photos would be great improvement
- Yes - But no fluid failure videos
- Yes - But no mention of "fluid failure"
- Yes - But obviously could be better
- Yes - But, I guess from C1 above I would think if photos and videos are available it would be nice to see in future training

- Yes - Captain judgment on when to send crew member to cabin for overwing viewing
- Yes - Color photos or tape would be very meaningful
- Yes - Could have spent a little more time on it, and a review in years to come at each training visit
- Yes - Cover above areas more thoroughly
- Yes - Deicing is largely learned by experience. Error to the side of safety when in doubt. Only the Fed's would be ignorant to cover every situation/condition. It just doesn't work that way folks!
- Yes - Don't recall C1B to C1E
- Yes - Don't recall good videos of fluid or having failed. Very detailed and comprehensive verbal descriptions however
- Yes - Except about fluid failure
- Yes - Except for C1 above (which is new to me)
- Yes - Except my company uses the term freezing fog and I have not been able to find a definition. I've assumed it's the same as ice fog
- Yes - FYI, if we have any doubt about the deicing process, we just return & deice again
- Yes - Fluid failure images have been in text form - verbal description in FOM and some company publications
- Yes - Ground crews really need more training to put them on the same page as us, especially during marginal conditions (i.e., gray areas do we deice or not?)
- Yes - Ground holds should be established at NY Airports for "HOT" departures
- Yes - However, I don't ever recall receiving training regarding fluid failure
- Yes - However, seeing live fluid in process of failure as mentioned in C1 above would be helpful in leaving a lasting impression
- Yes - However, the information regarding procedures, etc. sometimes does not keep up with the new fluid technologies being used
- Yes - I guess so
- Yes - However, would like to see the items mentioned in C1
- Yes - I don't think pictures of fluid failure would make my training any better
- Yes - I think it would be good to be shown (live) fluid in the process of failure due to different types of precip
- Yes - I thought so I never saw fluid failure
- Yes - I thought so until this last group of questions dealing with fluid failure
- Yes - I was hoping for more info on color/visual cues to identify fluid failure from within the cabin
- Yes - I would still like more information i.e. pictures, video
- Yes - If in doubt - deice again
- Yes - In another life used to "observe" any accretion while flying, if none would fly approach/landing with COLD WING. Land, offload, onload report-snow would blow off. Now, today, are recommended turn "on" wing/eng.
- Yes - It is quite tough recognizing fluid failure from inside the a/c in the midst of medium/heavy snowfall
- Yes - It might be better to give training just prior to winter month rather than whenever recurrent training is due. Talking deicing in TUNE does not seem to have the same impact
- Yes - It seemed as though it was. I have considered time and WX conditions along with experience to be my most valuable asset on this matter
- Yes - It was OK, but more can be done. Mandatory class (one day) prior to ice conditions exist, more information available in general
- Yes - It works
- Yes - It's not the training it is the amount of money invested into equip/personnel at airports that operate in snow/ice
- Yes - It's the personnel doing the deicing who need additional training
- Yes - Lots of text from Company. Little or no video
- Yes - More pictorial info on fluid failure would be useful
- Yes - More than adequate. Our airline provides a laminated card with procedures and holdover times easily understandable
- Yes - My airline conducts initial training and annual recurrent training in deicing/anti-icing procedures. The videos and platform instruction are second to none
- Yes - My airline does not address fluid failure, if there are any contaminants present we deice
- Yes - My airline has a good anti/deicing training program, with the exception of instruction in fluid failure
- Yes - Only had 1 color video. It was adequate
- Yes - Other than fluid failure
- Yes - Our training primarily insists that if we have any question as to the condition of the wings or airframe we get deiced again. Always mindful of our HOT
- Yes - Photos/videos in C1
- Yes - Put some training on A/I & deice during ANNUAL REA TRX. Something other than video & bulletins
- Yes - Satisfactory for procedures in place
- Yes - Regarding photo questions above - I just can't remember. I feel very comfortable with ground deicing due to both training & experience
- Yes - Satisfactory. Need to better teach ML what to look for when I look out thru windows just prior to takeoff
- Yes - See A3 comment (Cabin inspection of wing surface at night is very difficult. Should ALWAYS be tactile when required)
- Yes - Show us the items marked "NO" in C1 above
- Yes - Some of the photo referred to above would have been very beneficial
- Yes - Suggestion: it would be helpful to allow (as part of the company deicing procedure) the Captain to continue taxiing in the pre-T/O line up of a/c, while the first officer conducts visual check from cabin
- Yes - Training at NWA is excellent
- Yes - The idea of showing what fluid failure looks like is a great idea
- Yes - The only fluid failure training received was based on time and some cockpit ques. No visual recognition of what fluid failure looks like
- Yes - The pictures or videos would have been a plus
- Yes - The training at the commuter I worked for (flew ATR's) was EXCELLENT - at the major I work for now was nearly non-existent
- Yes - Though fluid failure is not a specific aspect of training, procedures that deal with holdover time in

relation to precipitation severity leave little room for error when it becomes time to decide whether

- Yes - Training could include more graphical illustrations
- Yes - Training described in C1 would be helpful
- Yes - Until I answered C1
- Yes - Use judgment and safety as your guide
- Yes - Videos and pictures of fluid failure would be interesting and useful
- Yes - We have a great program, but I never knew there were pictures of fluid failure. I'd like to see these
- Yes - When in any doubt I'd return to the deicing area. However I have devised my own standard to "How to recognize" an out of limits condition
- Yes - With exception of C1. Info on fluid failure is needed
- Yes - With the exception of recognizing fluid failure, it seems that we are to rely on common sense
- Yes - Would be best to actually see fluid failure - It is easy to recognize once you have actually seen it
- Yes - Yes, for the most part
- Yes - You know after 30 years you get a feel for what's going to kill you and what isn't when it comes to the snow you're taxing out in
- Inv. resp. - A good quality video would be nice showing all the above
- Inv. resp. - A standardized video produced by fluid manufacturer., a/c manufacturer., ALPA safety, FAA
- Inv. resp. - Better instruction on recognizing fluid failure, as you suggest with question C1 would be good
- Inv. resp. - Have color photos of fluid failure placed in the operations manual in the deicing section or winter ops section
- Inv. resp. - Sort of. It was all self-taught with company training
- Inv. resp. - Somewhat
- Inv. resp. - I thought so, until you mentioned the above items. I'm not certain that the term "fluid failure" has been used in training. I just look for "contamination"
- Inv. resp. - Weak boring video that needed better contrast of fluid failure

C3. In this winter season, have you had reason to question the quality or capability of deicing service provided to your aircraft at the gate or deicing pad prior to departing the gate/pad?



Have you had reason to question the quality/capability of deicing

[Invalid responses: 29 (2%)]

Comments:

- Yes - 1 hr 15 min at IND since deice requested new fluid due ZBR & snow
- Yes - 2 out of 3 deice trucks broken took twice as long to get deiced sometimes
- Yes - 3 times deice tried to talk me out of deicing. They did not seem to understand need to deice. They and/or their supervisor need more training
- Yes - A couple of times, inexperienced operators caused me concern. I visually inspected the a/c & had the a/c re-deiced
- Yes - Actual external inspection of deiced and anti-iced surfaces
- Yes - Advised personnel of inadequate deicing
- Yes - Aircraft wings covered in frost and station manager was surprised we needed deicing
- Yes - All subject to the guy in the bucket spraying. We look out the window over the wing & hope then didn't it right
- Yes - Always suspect tail is inadequately deiced. I always go outside to check. This is not to say our crews do not adequately perform procedure
- Yes - An APU was ruined by lack of knowledge of procedures by ground crew
- Yes - Ask the deicers to hit some spots they had missed
- Yes - Asked deice crew to do it again and follow written procedure
- Yes - Asked for a re-spray of areas in question. Make personal inspection
- Yes - Asked for another "opinion" from deice "controlling agency"
- Yes - Asked for more
- Yes - Asked for more information
- Yes - Asked for more specific information poor communications from ramp control and deice control
- Yes - Asked for Type II
- Yes - Asked if wing was clean
- Yes - Asked questions-MD8 clear ice check a pencil process at many stations-Entered in log before done!!

- Yes - Asked the crew to hit the missed areas
- Yes - Asked to be deiced again on specific surface (props are often overlooked by ground crews)
- Yes - Asked to be re-deiced
- Yes - Asked to have another inspection. Returned to gate to be deiced, another ice on our wings (frost)
- Yes - Asked to have entire aircraft deiced again
- Yes - Asking deicing personnel for fluid type and start and stop times to determine HOT (See note A3)
- Yes - At a small station the ground personnel felt defrosting was not required because OAT was above freezing even though the wing had a thick layer of frost on top surface
- Yes - At my company the ground personnel were told that they made the deicing decision not the PIC. Not in my aircraft they don't
- Yes - Attempted to use Type II only when Type IV needed also, got both
- Yes - Before rush deice was re-accomplished
- Yes - But sometimes - do you "REALLY" want to know
- Yes - Call deice crew to return and deice #2 engine inlet
- Yes - Called Flight Manager, personally inspected the a/c and found ice on trailing edge of wing - we were deiced again
- Yes - Called for a re-deice of all or part of the a/c before leaving the deice pad
- Yes - Called for another inspection
- Yes - Called for further verification
- Yes - Called for re-deice
- Yes - Called maintenance to determine fluid mix
- Yes - Called the crew back for more deicing
- Yes - Called the deicers back to get my post-deicing report
- Yes - Called the deicing crew back for additional deicing
- Yes - Called the man in charge and had them do it over again and do it right
- Yes - Can take no action-have to rely on the person deicing that surfaces that I cannot see have been deiced
- Yes - Cancel the flight. Really lousy WX that day
- Yes - Canceled flight
- Yes - Carefully checked
- Yes - Check the aircraft myself
- Yes - Check wings
- Yes - Checked deice vehicle fluid temp/ground crew's application and coverage of a/c
- Yes - Checked wings from inside cabin
- Yes - Cleared up via radio communication
- Yes - Closely question deicing crew-chief - Sometimes hard to get straight answer
- Yes - Cold deice fluid (Type I at that) was encountered a few times at Little Rock, Ark. airport
- Yes - Cold, dry, fluffy snow on wing was not ADHERING. Deice crew said we needed to deice. The (we) crew said no we don't. Confusion & delay caused by lack of deice ground crew training. Do not deice. Snow blew off
- Yes - Company personnel required us to deice when in my opinion deicing was not required (feather bedding; certainly not unsafe)
- Yes - Complained
- Yes - Complained - not enough equipment and or fluid
- Yes - Confirmed with radio exactly what we received
- Yes - Consulted with Chief Pilot & ramp sup.
- Yes - Contact deicing manager
- Yes - Contact ground operations
- Yes - Contact supervisor & return for a 2nd deice
- Yes - Contact supervisors, re-deice
- Yes - Contacted ground crew via interphone to clarify situation
- Yes - Crew at DTW did thorough job but took 3 trips and 25 min to deice a DC-9. It was not that thick and was not falling that fast
- Yes - Deice equipment inoperative.
- Yes - Deice only took 1-2 min from an FBO. We realized this could not be enough time. We confirmed what had been deiced: they never did the tail surface. We had them re-deice the entire a/c
- Yes - Deice over
- Yes - Deiced again
- Yes - Deiced again
- Yes - Deiced again with different fluid
- Yes - Deiced at gate then took small delay for additional baggage or freight; due to extreme WX conditions and delay-asked for (& received) 2nd deice after pushback
- Yes - Deiced to soon before arriving @ gate
- Yes - Deicing Coordinator did not give me the mixture or Type II (i.e. 100%, 75%, 50%) need that to determine holdover time
- Yes - Deicing began prior to the a/c fully configured for deicing. Flashed taxi lt. and told deice coordinator to stop
- Yes - Deicing crew was not trained to assess the need to deice, so I made the inspection and decided to have a/c deiced
- Yes - Deicing crews OK/DC9 upper wing inspection people need more experience/training
- Yes - Did another walk around , found ice on a/c, asked to be deiced again
- Yes - Did my own follow up check
- Yes - Did not notify cockpit prior to deicing-verified with mechanic that it was done
- Yes - Didn't leave gate and re-deiced
- Yes - Directed crew to missed areas
- Yes - Done at BWI thru outside source using non-standard procedures-Had to stop deice truck driver & ask specifics
- Yes - Do it again (deice)
- Yes - Doubt was with ground personnel inspecting wing. I inspected myself
- Yes - Due to liability and lawyers, the a/c is deiced even when not needed
- Yes - During gate deicing-when time had expired I got deiced at another airlines remote deice pad
- Yes - During light freezing drizzle, deice person refused to apply Type II fluid until I refused to depart
- Yes - Early Dept. when a/c was deiced hours earlier by the mid-night shift. About 10-20% of time re-deicing was needed
- Yes - Either got right out of there, wasn't anymore precip
- Yes - Elected not to go
- Yes - Evaluated WX/temp/precip & used many years experience to make the call

- Yes - Examined aircraft, talked face-to-face with ground agents, inspected wings, including tactile check
- Yes - Examined wing and control surfaces and asked for re-shoot of unfinished areas
- Yes - Exit aircraft and re-inspect aircraft personally, point out areas to deice again to deice crew
- Yes - FRA Germany had to be reminded to deice us - we would NOT accept frost on the wings!
- Yes - Face to face discussion with contract deicer
- Yes - Foreign - deice again
- Yes - Further question the deice crew
- Yes - Gave better instructions and clarified to crew at MSP
- Yes - Get another contractor to deice us
- Yes - Get off aircraft and do my own post-check; demand another deice
- Yes - Got a supervisor involved
- Yes - Got deiced again
- Yes - Got it corrected to my satisfaction although station people clueless
- Yes - Got out and looked at the airplane
- Yes - Got out of aircraft and did our own post-check
- Yes - Got out of aircraft and inspected, had the a/c re-deiced
- Yes - Got out of seat - visually inspected - had aircraft re-deiced
- Yes - Got out of the a/c and did tactile test. Had deice crew re-do a/c twice.
- Yes - Got Type IV fluid by demanding it!
- Yes - Ground crew did not want to take any responsibility in determining whether we needed wing deicing. We taxied out & were told by "snowman" at deicing point that we did not need deicing .. waiting 30 min.
- Yes - Ground crew disagreed with my decision to deice. They failed to spray the tail. I called them back to complete the job
- Yes - Ground crew said "You're OK, just a little frost". We said "Deice anyway"!
- Yes - Ground crew seemed uncertain as to type of fluid/mix in use. Made them check with supervisors
- Yes - Had a sup. do the post-check, who in turn found the deicing we received was unsatisfactory.
- Yes - Had a/c re-deiced with correct mixture and/or fluid
- Yes - Had a/c re-inspected
- Yes - Had aircraft deiced again
- Yes - Had aircraft sprayed again
- Yes - Had an experienced deicer from another carrier inspect after deicing
- Yes - Had another airline re-deice a/c
- Yes - Had crew come back to aircraft
- Yes - Had deicing re-applied
- Yes - Had ground crew re-spray
- Yes - Had it done again time consuming & expensive
- Yes - Had problems get in info, i.e., start time, type fluid/mix
- Yes - Had slush/wet snow removed from wing root area after deicing
- Yes - Had station deice a/c again to my satisfaction
- Yes - Had the a/c deiced again (**X 6 responses**)
- Yes - Had the deicer spray various areas of aircraft again.
- Yes - Had the plane re-sprayed twice. Totally incompetent deice crew in PDX
- Yes - Had the wings deiced, because the ground inspector said I did not need it. Ten minutes previously I saw noticeable frost on the wings
- Yes - Had them re-verify that the a/c was clean & re-verify the holdover times, type fluid & mixture
- Yes - Had them spray additional surfaces of aircraft
- Yes - Had them start over. Our companies average seniority on the ramp is 6 months - they have no idea what is going on
- Yes - Had to ask for start and stop time, what fluid was used and mixture
- Yes - Had to ask which brand of Type IV was used
- Yes - Had to call out flight manager on duty to explain to ground crew deicing procedures
- Yes - Had to direct ramp personnel where to spray! They told us post-check was complete and aircraft was still covered with ice (freezing rain)
- Yes - Had to go along-NWA procedures to follow ground deice input. Only in the last week has the Capt. been given authority for his aircraft book
- Yes - Had to make my own decision as to whether deice good enough to go - I went
- Yes - Had to personally and supervise operation - Notified management, was told it was my responsibility
- Yes - Had to personally walk around a/c with deicing personnel after noticing how much they were missing
- Yes - Had to re-deice
- Yes - Had to verify that Type II was used because initially Type I was all that was conveyed
- Yes - Had to verify deicing was in progress - before a/c was configured. Have not always received start times and mixture %
- Yes - Hastened takeoff with a V2 +25 rotation
- Yes - Have the ground crew re-deice the a/c
- Yes - Have them deice the tail section again when in doubt if they actually "hit" it
- Yes - Have trucks return to a/c to do exactly what I have instructed them to do
- Yes - I always have a visual check of deicing prior to gate departure
- Yes - I educated the people on current procedures
- Yes - I feel that there is high turnover with the ground personnel that we utilize. They are close to minimum wage and not given extensive training
- Yes - I get out and do a tactile
- Yes - I got out of the a/c & did an up-close visual inspection myself
- Yes - I got out of the a/c and visually inspected it
- Yes - I inspected aircraft myself at gate
- Yes - I inspected the aircraft while walking around it at the deice pad. Our company uses old and broken down equipment
- Yes - I observed them failing to deice the empennage of one of our other a/c. Called the crew on Co. Freq. & they required another deice. We're at their mercy in large a/c
- Yes - I opened the door of the aircraft to get a better look at a contract deicing crews job. I then printed out areas I wanted better deiced
- Yes - I performed a walk around at the deice pad each time I questioned the service

- Yes - I question the whole concept of gate deicing. Deicing pads at runway ends would help solve a lot of problems
- Yes - I requested them to redo all or part of the a/c
- Yes - I sent the inspector back to the elevators specifically to look for snow or ice "adhering" to a/c. I don't like unnecessary deicing
- Yes - I talked to the ground crew and coordinator to rectify the situation
- Yes - Improper horizontal stabilizer and elevator deicing - personally supervised repeat application
- Yes - Incomplete deicing - had to call them back twice to get proper job
- Yes - Inform company
- Yes - Informed Captain - he did nothing
- Yes - Informed tower so there was minimum delay (they were understanding and helpful)
- Yes - Inquired as to type of fluid used & mixture when not given by ground personnel. Visually checked wings for accumulation
- Yes - Insist on the type we wanted!
- Yes - Insist on Type II or IV for anti-ice instead of just Type I
- Yes - Insisted on complete deice/anti-icing
- Yes - Inspect airplane myself and question deice personnel to insure areas I could not see were clean
- Yes - Inspect wing surfaces personally
- Yes - Inspected a/c visually
- Yes - Inspected aircraft, had the aircraft deiced again
- Yes - Inspected wings from inside cabin
- Yes - Inspected wings ourselves
- Yes - Inspection
- Yes - Interrogated deicing crew and had additional deicing accomplished after FO inspected a/c
- Yes - It happened at an outstation. I got off the a/c and verbally instructed the personnel how to do it.
- Yes - It is often difficult to establish a communications link with deice personnel. It seems as if they have their own agenda & don't listen to captain/crew. Especially at outstations. More training needed
- Yes - Just requested & received additional deicing
- Yes - Just return back to pad for Type II fluid (long taxi) should have been deiced at end of runway (no long taxi)
- Yes - Looking at wing saw dry spots with ice still adhering
- Yes - Made sure it was done right
- Yes - Made them deice a/c
- Yes - Made them do it again!
- Yes - Made them do it over until it was done adequately
- Yes - Made them physically check the wing
- Yes - Made them re-deice and I checked when they were done to see it was done properly
- Yes - Made them spray the tail again because another crew who could see the first application radioed me and said the tail was not completely deiced
- Yes - Make an extra pre-takeoff contamination check
- Yes - Make them redo it
- Yes - More clearly communicated with deicing service personnel about procedures
- Yes - Mostly I question the inspection to determine if deicing is required. At my airline inspections are done by ground personnel. I frequently do the inspections myself
- Yes - Must aggressively query deicing personnel for fluid mix, start - finish times, etc.
- Yes - New people with little knowledge
- Yes - No action - only Type I fluid was available
- Yes - No action, equipment no working didn't go, or had to wait till got it fixed
- Yes - None
- Yes - None required - because in all cases in question we deiced when I know we didn't have to - new ground people seem to error on conservative side
- Yes - None-DIA-North hangar deice & even west side runway deice - painfully slow - are they competent?
- Yes - None. The crew deicing uses excessive amounts of fluid or deiced when not needed
- Yes - Noticed other company a/c T/O with ice on fuselage, told them everything, everywhere should be off a/c
- Yes - Numerous times, I have had to request the information (type of fluid, time started) necessary for calculating holdover times
- Yes - Once had the airplane deiced again
- Yes - One incident where it was snowing (Howling Snow) temp 14, very dry and the company chose to deice. Not a smart move because now we have wet wings and now snow adhering to a wet surface
- Yes - One time Type II was diluted and I thought you couldn't do that. One other occasion Type I was used to deice and the heater unit was inoperative
- Yes - Only once: when I ask for MD80 wing, root deice, was told that the truck was not "warmed-up". When they showed up 10 mins later, decided to check it myself-Turned out OK
- Yes - Only Type I fluid available - delayed departure until better conditions (WX)
- Yes - Only when using Type I deicing fluid
- Yes - Our own deicing in heavy snow in Rochester MN didn't see any reason to do the fuselage. It was corrected
- Yes - Opened the door, went outside and pointed to the area where I could still see ice from the cockpit
- Yes - Our policies are not known or done by our ground crews
- Yes - Personal inspection of surfaces
- Yes - Personal supervision
- Yes - Personal supervision of the process to include directing deice personnel regarding procedures
- Yes - Personally checked and/or deice again
- Yes - Personally inspected the aircraft
- Yes - Physically checked all surfaces
- Yes - Physically inspect the aircraft for myself from the outside
- Yes - Pink (wrote up a discrepancy report)
- Yes - Pink sheet
- Yes - Point out to the ground personnel what the correct process is and require them to do it correctly before departure
- Yes - Poor communication on deice crew/less than adequate deicing
- Yes - Poor equipment & a seeming lack of knowledge by deicing personnel on how to deice

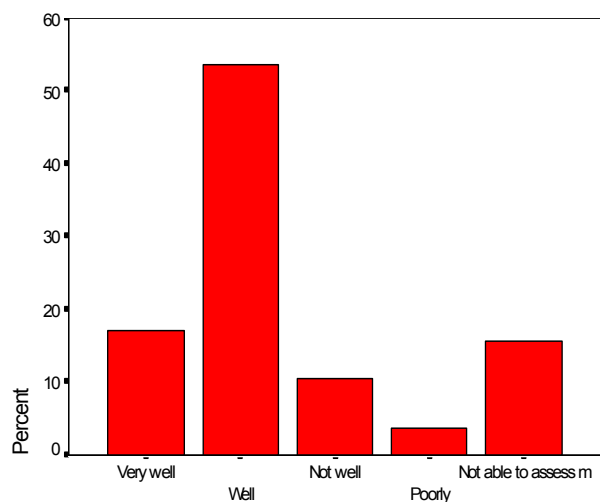
- Yes - Pre-takeoff inspection and queried the deice coordinator (on-site)
- Yes - Primarily at smaller stations where only Type I fluid available. Suggested that company at least get them Type II
- Yes - Provided my own personal check
- Yes - Pursued clarification with ground crews
- Yes - Questioned and confirmed exact info from supplier
- Yes - Questioned deice crew - physically inspected surfaces
- Yes - Questioned deicing crew on procedures, brought to attention of chief pilot
- Yes - Questioned if whole a/c had been deiced (heavy snow was falling) called for return of truck
- Yes - Questioned the deicer in person - noted the failure to the company
- Yes - Questioned the deicers directly about areas sprayed, made them come back and re-spray
- Yes - Radio communications
- Yes - Radio contact with station providing service to have portions or all of aircraft re-sprayed
- Yes - Ramp said aircraft had been deiced, it didn't appear to us that it had (ice still present), called ramp & had them do it again
- Yes - Re inspection
- Yes - Re-deice right wing
- Yes - Re-deiced (**X 10 responses**)
- Yes - Re-did deicing/anti-icing procedure
- Yes - Re-inspected a/c after deicing
- Yes - Re-inspected a/c from outside and requested another deicing pass around the a/c
- Yes - Re-inspected wings got out of a/c after shutting down engines to re-inspect
- Yes - Recalled deice crew to spray left leading edge near fuselage. They returned & said it was re-sprayed. F/O rechecked. Area was **not** done recalled crew for deice
- Yes - Refused the flight until proper deicing was completed
- Yes - Refused to leave the gate and/or the "secondary deicing pad"
- Yes - Refused to move a/c from pad until adequate deice work performed by company MX
- Yes - Re-inspected entire a/c
- Yes - Related incident to Chief Pilot
- Yes - Request a hands on inspection
- Yes - Request additional service
- Yes - Request better communications
- Yes - Requested additional deicing
- Yes - Requested additional deicing
- Yes - Requested clarification from deicing guy who plugged in because he told us of a type he was using which was different from that "iceman said"
- Yes - Requested confirmation of icing checks
- Yes - Requested fluid concentrations were note the same as our quick reference cards
- Yes - Requested more fluid & a second visual inspection (and tactile)
- Yes - Requested re-inspection & deice as necessary - received minimal deicing (2nd inspection)
- Yes - Requested re-spray with deice & anti-ice fluids
- Yes - Requested that the a/c be re-deiced
- Yes - Requested to crew to perform deice again - but correctly
- Yes - Requested type of fluid used
- Yes - Required remedial action
- Yes - Required the ground crew to deice the aircraft again after instructing them on the procedure (outstation)
- Yes - Rime ice on arrival wasn't removed after deice crew said was. Got up went outside at departure & saw ice on all unheated surfaces. Crew just wet down wings with Type I & left. We took a delay & got it right
- Yes - Sat at gate until a/c was fully deiced then went to pad for final spray & inspection with Type I fluid-(FY1) Type I fluid was all that was available
- Yes - Several instances of ground personnel wanting to deice an airplane with no ice
- Yes - Shut down flight operations until proper deicing could be completed
- Yes - Shut-down reapplication by another trained personnel
- Yes - Simply evaluated the capability of the aircraft to fly under the circumstances
- Yes - So instructed ice crew on importance of clean wing ROOT
- Yes - Some cities still have only Type I
- Yes - Some outstation did not have anti-ice capabilities
- Yes - Some stations only have Type I fluid - freezing rain in STL it was useless-took 1 her + delay to get other airline with Type II
- Yes - Spoke directly to deicing team to find out their exact procedures
- Yes - Spoke directly to the deicing crew
- Yes - Spray again, not go
- Yes - Started before flaps were extended so we started over
- Yes - Started the entire process over
- Yes - Submitted written statement to company on poor training of deicing personnel
- Yes - Talked to the deicer directly on went and looked at the wing
- Yes - Talked to/questioned ground crews to resolve issues & answer questions
- Yes - Tendency for some small stations to save money and not deice in cases where some Captains would opt not to deice
- Yes - The ground crew didn't know how to switch the truck from Type I to Type II so I waited about 45 minutes for the snow to lighten up to the point we could use Type I
- Yes - There doesn't seem to be much I can do about our poor quality of deice equipment!
- Yes - There have been several occasions where I checked the aircraft. No ice was present however the deicing crew still said we needed to be deiced. We did to CYA
- Yes - There was some question over whether the landing gear had been deiced and asked for ground crew inspection prior to T/O
- Yes - They overdo it. They waste pax time, and company money
- Yes - Time to takeoff
- Yes - Told ground crew to spray again
- Yes - Told ground deicing to return to aircraft and deice us again

- Yes - Told ops that a/c needs to be deiced again/deiced initially 1 hr prior to depart., however it was still snowing, should be prior to/after pushback
- Yes - Told ops that they were not following proper procedure
- Yes - Told the crew we wanted Type IV instead of Type I
- Yes - Told the deice crew to do it again and do it correctly this time!
- Yes - Toronto because I wasn't familiar with how it would be done and/or how long before I would be in position to T/O
- Yes - Training of personnel
- Yes - Twice-Denver and Chicago-deice procedure was repeated
- Yes - Type I only available in moderate snow. Waited for snow to slow & deiced again near T/O runway
- Yes - Type IV fluid not loaded on trucks freezing precip - delayed for Type IV
- Yes - Used Type I only - requested & received Type IV
- Yes - Used Type I when Type II would have been more appropriate
- Yes - Verbal confirmation & re-inspection
- Yes - Verbally briefed employee assigned to deice our a/c
- Yes - Verbally clarified the procedure with the crew
- Yes - Verbally instructed the deicing crew to deice us again
- Yes - Verbally insured with coordinator. that both bottom & tops of wings and horizontal stab had been deiced. Just 1 time
- Yes - Verified & confirmed what action/deicing was performed
- Yes - Verified no precip buildup prior to departure (Type IV - is optimum)
- Yes - Verified with deicing what they had done/seen
- Yes - Viewed wings from inside cabin to verify effectiveness
- Yes - Visual check work and have the plane re-deiced
- Yes - Visual inspection & had to be re-deiced. Many stations don't tell what info is needed after deice complete
- Yes - Visual inspection by air crew - hands-on by ground crew
- Yes - Visual inspection of my own
- Yes - Visual walk around, request additional deice
- Yes - Visually and tactile check aircraft. Had them deice again
- Yes - Visually inspected aircraft and asked to be deiced again
- Yes - Wait & wait & wait
- Yes - Wait!
- Yes - Waited for conditions to improve - WX had heavy freezing rain/ice pellets - Type I & IV could not handle it
- Yes - Walked out in jetway and saw ice patches and had crew re-squirt airplane (I showed them these areas myself)
- Yes - Watched crews carefully as well as watching deice/anti-ice of a/c
- Yes - We delayed the flight until we could establish communication with the deice crew and thereby determine our deice/anti-ice was complete
- Yes - We got out. Found ice on the airframe and asked to re-deice
- Yes - We had a come to "Jesus" meeting
- Yes - We had just changed deice service providers - I verbally verified that they had used proper fluid/procedures
- Yes - We had the entire aircraft deiced a second time
- Yes - We questioned the deice crew on several occasions
- Yes - We refused to depart until they could deice us with capable equipment
- Yes - We still have outstations where personnel do not know what to look for
- Yes - We were deiced with a "big gulp" cup from 7-Eleven. Not kidding!
- Yes - We were told to go to the deice pad but inspected ourselves & found clean wings. Why introduce weight & chemicals, waste time & money if there is NOTHING ADHERING to the control surfaces?
- Yes - Went back and checked the wings visually
- Yes - When a station does not even know how to give us the deice verification "speech", how can we be sure our a/c was deiced properly?
- Yes - Where deiced are early AM departure and crew shows up. Don't like to be deiced early. What time? Holdover time? Should deice crew be at airport or just prior to pushback
- Yes - Will not deice at gate during moderate or heavy snow. Made a/c ready for taxi after deice
- Yes - Wrote a safety issue to the company
- Yes - Wrote company report
- No - Been a nice winter this year with little deicing
- No - But I didn't deice this year
- No - Deice crews do a good job
- No - El Nino drastically reduced the need for deicing
- No - I have only witnessed competence
- No - I personally make sure my a/c is ice-free prior to takeoff. I use my entire crew, speak with deicer personally & make visual/tactile inspections myself
- No - In the year previous - Type II fluid was provided improperly 2 times
- No - Just had to insist that we GET it.
- No - My company has been very conservative even deicing, when it was not necessary I didn't refuse the service
- No - Not me personally but some other in my system
- No - Our airline does an extremely good job deicing aircraft!
- No - Our company is very thorough
- No - Our people do a good job to make sure that we are clean
- No - Re-deice entire aircraft
- Inv. resp. - Walked around the aircraft and made an outside inspection as well as an inspection from the cabin before leaving gate
- Inv. resp. - Don't remember
- Inv. resp. - In training
- Inv. resp. - Re-deice
- Inv. resp. - Was not deiced (X2 responses)

C4. Does your airline designate specific representative surfaces for assessing fluid failure for the aircraft you fly

Yes	61%
No	34%
Invalid Response	5%

If yes, how well have you found the representative surfaces to represent the surface conditions of the wing?



How well do representative surfaces represent surface conditions

Aircraft Type	Very Well	Well	Not Well	Poorly	Not able to assess most of wing	No. of responses
B727	20%	54%	7%	5%	14%	125
B737	16%	60%	13%	3%	7%	98
B747	18%	57%	4%	6%	16%	51
B757	16%	44%	14%	3%	22%	63
B767	24%	47%	11%	3%	15%	66
B777	21%	50%	17%	0%	13%	24
DC9	20%	48%	12%	3%	17%	157
DC10	20%	54%	9%	1%	16%	69
MD80-90	7%	67%	13%	0%	13%	61
A320	15%	60%	12%	3%	11%	94
BAe31	16%	57%	8%	5%	14%	37
Saab 340	11%	65%	5%	8%	11%	37
ATR 72	5%	25%	10%	5%	55%	20
DH-8	0%	30%	20%	10%	40%	10
Beech 1900	40%	40%	0%	0%	20%	5
Total	17%	54%	10%	4%	16%	917

Comments:

Very well - Always used same procedure
 Very well - As Captain I have the F/O go back to perform the check

Very well - At gate pushback & remote pad
 Very well - Dullness of wing surface
 Very well - I fly a T-tail aircraft & top of tail does not get deiced very well
 Very well - It is the surface of the wing
 Very well - It is the wing
 Very well - It is the wings
 Very well - On the 727 I frequently check the wing with my hand to determine if I have a clean wing
 Very well - Representative surface IS the wing
 Very well - Representative surface is the wing
 Very well - Representative surface is top of wing viewed through specific cabin window
 Very well - Sometimes have to move a fat pax from their seat!
 Very well - Small aircraft, small surface, visible from the cockpit
 Very well - The wing
 Very well - The wing is the representative surface
 Very well - Viewing wing from cabin
 Very well - We are required to make a walk through the cabin and assess the condition of inboard wings/engine nacelle under certain situations. We have good representative surfaces
 Very well - We assess the wing
 Very well - Wing sensors!
 Very well - Wing surface if any doubt used
 Well - Allowed to check wings from cockpit if holdover not exceeded-this is a job-can't see wing
 Well - Area is in clear view however with the color of the wing it makes it most difficult to see. STRONGLY suggest black stripes (like TWA) would help a lot
 Well - Black stripe half way. Our on wing absorbs more heat especially with heavy frost. This stripe is clean when rest of wings not-stripe is used to detect need to deice
 Well - Brighter wing inspections lights would help at night
 Well - But viewing across three passengers & out window is very poor
 Well - Can't see the tail
 Well - Crew normally unable to realistically assess wing icing from cabin (with deicing fluid running down window especially at night)
 Well - Depends on exterior light intensity-day/night low level lighting
 Well - Difficult to see fluid failure on aluminium
 Well - Especially hard to see at night
 Well - Holdover times - assess conditions and go with the holdover times in the specific conditions
 Well - However at night very difficult to do
 Well - I assume an accumulation of snow on the wing
 Well - I can see a large portion of the left wing from the cockpit but when the window is covered with deicing fluid it is difficult to see
 Well - It can be hard if Type I is on the window
 Well - It is much harder to tell at night
 Well - It is much more difficult at night however
 Well - Looking out the windows over the wing is sometimes very difficult because of fluid on window, WX conditions. PAX location etc.
 Well - Loss of shiny surface - becoming opaque

- Well - MD-80 clear ice check
- Well - My company paints a black stripe on each wing to aid in ice/snow/frost detection
- Well - Not well at night
- Well - Only for daytime operation, poorly for night
- Well - Only reason I don't say "very well" is that wing lights could be brighter and wider-focused to give better view at night (my experience with both B727 & A320)
- Well - Our procedure is to actually go back and look at the wing from the cabin just prior to takeoff
- Well - Painted black strip length of to help detect ice on irregular surface
- Well - Refer to C2
- Well - Representative surface was the wing!!
- Well - S
- Well - Should have some cockpit indication
- Well - Snow & ice are not very easy to see in any light on a white painted wing
- Well - Sometimes difficult to see at night
- Well - The critical area overwing in front of the engine
- Well - The instructions are not entirely accurate by my experience, but the error is conservative
- Well - The problem is identification of fluid failure at night
- Well - Very difficult at night
- Well - We inspect the wings visually 5 minutes prior to T/O
- Well - Well in daylight - poor at night
- Well - Well, although very difficult to see through soaked window
- Well - When ground deicing program is in effect in our hub - you're not required to perform & walk around-but view wing from the cockpit
- Well - When most of fuel comes from below ground tanks, think representative surfaces are good. When it is fuel that has cold soaked in truck I wonder if wing could be colder than the representative sources
- Well - Visible from cabin. Did not have occasion to judge fluid failure-My 2 re-deicings were due to heavy snow/no holdover with Type I
- Not well - 727 wing difficult to assess-must be viewed from cabin window
- Not well - Accessing wing condition through deiced windows and snow is hard in many cases. Ground crews may have a better view of fluid on wings prior to T/O
- Not well - At night it is hard to define
- Not well - At night it is very hard
- Not well - Because the VIEWING AREA affords a marginal view at best of the wing area
- Not well - Can be very difficult to tell
- Not well - Can not be seen well from inside aircraft following deicing - visibility from windows is poor
- Not well - Cannot be viewed well from inside aircraft
- Not well - Clear ice need special attention
- Not well - Cockpit side window vision is normally impaired due to deicing fluid and/or precipitation
- Not well - Depends greatly on type of precip
- Not well - Difficult to assess in low visibility/night conditions
- Not well - Difficult to see condition of wings from cabin at night
- Not well - Difficult to see especially at night and in precip
- Not well - Fluid (on window) is usually obscuring view of wing
- Not well - From inside the aircraft it is difficult to tell if fluid has failed - scratched windows etc.
- Not well - Hard to see from window in cabin, since deicing fluid is smeared over the window and reduces visibility
- Not well - Hard to see thru foggy cabin windows
- Not well - I fly a high-wing aircraft. Hard to see extended spoilers in precip or at night
- Not well - Inadequate lighting, limited visibility
- Not well - It is difficult to get a good view due to deice fluid on passenger windows causing a "blurry" view
- Not well - It is hard to tell what is fluid failure on our wings without proper training
- Not well - It is very difficult at night to determine fluid failure thru a window streaked with deice fluid
- Not well - It is very difficult sometimes to have the visual acuity needed because of the contrast in lighting inside & outside of the a/c, & moisture on the outside of windows
- Not well - It would be better to view entire wing from rear doors
- Not well - It's light inside cabin and dark and blowing outside
- Not well - It's tough to see the wing through a pax window, especially at night
- Not well - Look at wing at designated window
- Not well - Looking out cabin window (especially at night) it's hard to tell if fluid is failing
- Not well - Looking out passenger windows that are smeared with runny deicing fluid, especially at night, cabin lights on is exceedingly difficult
- Not well - Looking through a cabin window covered with fluid, at night, for a "loss of reflectivity" on the wing...!
- Not well - Looking through a wing window over 3 people is not the best way
- Not well - Looking through cabin window with flashlight over passengers is virtually impossible to assess surface
- Not well - Must leave cockpit to see entire wings
- Not well - Need some kind of color field, a black area dose very well being able to tell if they're in fluid failure
- Not well - No vertical or horizontal stab verification
- Not well - OK in daylight but not night
- Not well - Only recently did they install wing ice light to see at night
- Not well - Particularly at night
- Not well - The wing is the R.S. as viewed from the cabin. The windows are clouded from the fluid, especially bad at night
- Not well - Too hard to access surfaces at night
- Not well - Too difficult to see wings from cabin windows over top over passengers
- Not well - Tough to see out cabin window with residual fluid on window & poor lighting on wing

- Not well - We check from cabin specified viewing point & wing surface. I've had better luck checking gear down through those cheap little flow viewers
- Not well - We look out a cabin window, we trust ground services to do a good job
- Not well - Window condition & lighting make it difficult to view wing from cabin
- Not well - Window is usually difficult to view from
- Not well - Windows covered by deicing fluid, or just dirty, poor lighting at night
- Poorly - Area too small, too far away, hard to see at night, can't really see wing, poor lighting/deice fluid on window impairs view
- Poorly - At night it is very difficult to see whether glare on boots is from the fluid or from contaminants
- Poorly - Difficulty looking over passengers out of aircraft window. At night this can be extremely difficult
- Poorly - I think the visual inspection is a poor tool
- Poorly - Looking at wing good idea but scares pax, we do it, but I rely on quality deice job and not exceed holdover
- Poorly - Looking over passengers with flashlight out small windows
- Poorly - Most of our problems come from under-wing frost - DC9
- Poorly - On DC-9 or any T tail a/c the horizontal stabilizer is most critical
- Poorly - Representative surface is visible portion of nose/radome which I believe poorly reflects condition of wing due to use of different fluids
- Poorly - Surface visibility while taxiing is very poor. The quality of the viewing window combined with structural visual obstructions contribute to this problem
- Poorly - The surface is the wing. Can't see the wing very well at all from cabin. Even lighting conditions vary greatly for visual inspections
- Poorly - They suggest where to look out of cabin. At night, this procedure is worthless.
- Poorly - Too hard to visually inspect wings from inside of cabin
- Poorly - View from inside is not adequate
- Poorly - Windows are normally obscured by fluid
- Poorly - Windows are sometimes erased. Night ops are difficult
- Comments for Response: Not able to assess most of wing
A more "practical" procedure for ATR would make our procedures more effective
- A view thru a plastic window (small) that is sometimes foggy or crazed
- After deicing it is hard to view the wing thru cabin windows because of fluid on the windows - the wings are not visible from cockpit of the DC9
- Assessment ability varies greatly with lighting/precip
- Big a/c have BIG wings, little a/c ...
- Cannot see out windows covered in deice fluid!! Dah!!
- Captain checks wing from inside cockpit - very small sample
- DHC-8 is high-wing aircraft. Makes it difficult to assess
- Deice fluid distorts ability to see out window
- Difficult to assess a high wing a/c
- Due bad windows (cargo a/c) & poor visual, need to touch to be sure
- Even viewing the wing from the cabin may not be adequate (lighting, viewing angle, dirty windows)
- High wing a/c
- High wing a/c - unable to see the top of the wing
- High wing aircraft upper surface of wing is not visible from cockpit and only marginally visible from entry door
- If anything, it's to go into cabin & look at wings from there
- Looking at wings from passenger windows that are covered with precip is a joke, especially at night!
- More for icing and not fluid failure. Not from cockpit not very well from cabin
- Not enough light to see well in dark
- Nothing to compare with to determine overall condition
- Only able to assess 1st 3rd of wing as visible from the cabin window
- Our representative surface is the wing
- Picture this: It's hard, snowing, 1500' visibility your wing is getting snowed on your cabin is full of people the windows are scratched & covered with deice fluid - CAN YOU TELL?
- Striped triangles are a joke. Parachute chords are a joke
- Supposed to look at top of nose to assess wing but usually can't see top of nose because of all the deice fluid on the windshield - even after using wipers
- This is almost impossible to do at night or with Type II fluid on your windows
- This is a joke in the dark, & the text we received on the failure of fluid during holdover is not clear-ambiguous
- Top of wing is too difficult to see through cabin windows
- Tough to view clearly through pax windows - especially at night (recommend wing inspection lights - DC-9)
- Trained ground crew do this
- Under many situations it's virtually impossible to properly access surfaces
- Viewable surfaces near the cockpit are used
- Visibility not very good from cabin windows sometimes
- Visibility thru windows inadequate
- We fly high winged aircraft
- We only assess the wing within 5 min prior to T/O
- Wing poorly visible through windows
- Inv. resp. - "Upper wing surface" is the only "representative surface" mentioned for assessing fluid failure
- Inv. resp. - A flat black painted surface on top of wing would be a big help
- Inv. resp. - Accumulation
- Inv. resp. - Again, "fluid failure" is an unknown term at American Eagle. Everything revolves around "holdover time"
- Inv. resp. - Basically check wing leading edges!! I defy a pilot to clearly detect a clean thin layer of clear ice on the leading edges when viewing them through cabin windows at night in low visibility
- Inv. resp. - Can never see wing adequately to judge fluid failure
- Inv. resp. - Do not at the runway where it is most important
- Inv. resp. - Do not know since I haven't been trained to assess
- Inv. resp. - Don't know (X 15 responses)

Inv. resp. - Fluid turns milky color, loses sheen
 Inv. resp. - Great question. Next time English
 Inv. resp. - Has not been a factor
 Inv. resp. - Have no idea what this means
 Inv. resp. - I assumed the flat surface receiving the most precip was where to look
 Inv. resp. - I do not make the visual inspection
 Inv. resp. - I look for a clean wing - not fluid failure
 Inv. resp. - It would be highly desirable to have dark sections of wing leading edge area
 Inv. resp. - Just the clean wing concept
 Inv. resp. - Look at wing from cabin
 Inv. resp. - Maybe - I don't know!!
 Inv. resp. - My F/O always assesses the condition of wing
 Inv. resp. - Never had to send someone back, yet!
 Inv. resp. - Not my job. Second officer does this.
 Inv. resp. - Not observed
 Inv. resp. - Not on my a/c type. But yes on others
 Inv. resp. - Not seen
 Inv. resp. - Not to my knowledge
 Inv. resp. - OK during day, Unsatisfactory. during night
 Inv. resp. - Only viewing point specified
 Inv. resp. - Our airline looks at the wings when required, i.e., holdover exceeded
 Inv. resp. - Probably upper wing surface itself
 Inv. resp. - S/O does inspection, I'm an F/O
 Inv. resp. - Snow on side windows during taxi
 Inv. resp. - Someone confirms the aircraft is clean after deicing - but only we check before T/O
 Inv. resp. - The "wing" is the area
 Inv. resp. - The surface is the wing with black stripes
 Inv. resp. - This question is ridiculous if we were able to know the full condition of the surfaces we would not need representative surfaces
 Inv. resp. - Unknown
 Inv. resp. - Very little exposure to icing on the DC9 so far
 Inv. resp. - We go AFT & look at wing itself
 Inv. resp. - We have trained ground personnel that do this
 Inv. resp. - Wing turning white, or frosty looking or snow sticking to wing

C5. How do you recognize failure of de/anti-icing fluid during snowfall?

Number not responding	220	(14%)
Number responding "?", "Don't know" or similar response	54	(3%)
Number with valid response	1,301	(83%)

Responses to question:

(Type II) Unable to absorb anymore precip. Type I - too much accumulation after deice

1. Holdover time 2. If snow starts sticking

? (X 8 responses)

? Buildup of snow

? If snow is building up

??? Looks appearance???

A "mottled" appearance, or loss of luster on wing surface

A dulling of the surface, roughness, snow accumulation, lack of transparency

A function of experience
 A shiny silver wing surface turning white or cloudy
 A spraying of the surface
 Absence of smooth glossy sheen on wing, leading edge
 pneumatic boots are helpful because their black color provides good contrast
Accumulation (X 33 responses)
 Accumulation & freezing
 Accumulation (always - if in doubt - don't go)
 Accumulation - color
 Accumulation and time exposed - HOT
 Accumulation and/or re-freezing
 Accumulation at the back edge of the deicing boot
 Accumulation does not absorb into fluid. Snowfall starts to build, overtaking fluid
 Accumulation of contamination, rough looking (sandpaper) surface
 Accumulation of snow/slush/ice/precipitation on wing surface (X 35 responses)
 Accumulation of snow against black background of deice boot
 Accumulation of snow mounting i.e. not melting or dissolving on wing surfaces
 Accumulation of snow on wings, other a/c wings & fuselage, "thin" or "clear" coating on wing
 Accumulation of snow with no runoff? Not sure
 Accumulation of snow, not integrating with fluid
 Accumulation of snow, streaked appearance, due to "dissolving" fluid
 Accumulation of snow/and or dull finish on wing actually seeing ice
 Accumulation of snow/non-shiny surface
 Accumulation of snow/slush type precip on wing
 Accumulation of snow/surface becomes dull
 Accumulation of snow; inability of the fluid to melt snow
 Accumulation of snow; progressive freezing, dull color
 Accumulation on a/c then check wing
 Accumulation on control surfaces
 Accumulation on nose/wings
 Accumulation on nose/wipers, windshield dulling of wings
 Accumulation on surface visible to the eye
 Accumulation on wing/wing upper surface (X 21 responses)
 Accumulation on wing - excessive is obvious
 Accumulation on wing and/or windshield
 Accumulation on wing or fuselage
 Accumulation on wings and/or dullness of surface
 Accumulation on wings, visual inspection
 Accumulation or snow on surfaces
 Accumulation over non-tanked areas
 Accumulation persisting on surfaces
 Accumulation to ANY degree, and expiration of HOT
 Accumulation, change in surface appearance (wing)
 Accumulation, precip not melting, discoloration of viewing areas on wing
 Accumulation/ground personnel
 Accumulation/slush on rep surface
 Accumulation/sticking
 Actual accumulation
 Actual snow visible on Type II surface-Still a judgment call with little to go on

Additional accumulations visible or change in consistency of de/anti-icing fluid	Buildup of contamination on wings over fluid or slush forming in fluid
Adherence (accretion of snow and ice such that it does not become altered by fluid (wing-fuzz))	Buildup of ice/snow on wings and visible areas around windshield
Adherence (hands-on tactile check)	Buildup of icing on the wing. Wing surface is no longer shiny and smooth
Adherence to wing (X 3 responses)	Buildup of snow (X 5 responses)
Adherence, cloudy appearance	Buildup of snow if heavy & dulling of fluid
Adhering snow	Buildup of snow in the area deiced
Adhering to surface (X 2 responses)	Buildup of snow on deiced surface becomes white again, not saturated, or able to shear off on T/O roll
Adhering to windshield	Buildup of snow on wing (X 3 responses)
Adhesion of particles	Buildup of snow or a change in fluid color from glossy to more opaque
Adhesion to rep surfaces	Buildup of snow, loss of glossy appearance
Adhesion to wing	Buildup of snow, snow appears gray from water/slush
After expiration of holdover time, visual inspection from cabin	Buildup on wing (X 3 responses)
After the snow lands it doesn't disappear	Buildup or failure to melt
An opaque look to the fluid or actual snow piling up on the wing	Buildup or milky appearance
Any "accumulation" on wing surface	Buildup over painted strips
Any accumulation on upper wing surface - grainy or dull look to that surface	Buildup-accumulation
Any accumulation/change in reflection	Buildup/accumulation on slanted surfaces
Any adherence to snow	Buildup/slushing
Any adhering to the wing	By appearance of crystals on surface and discoloration
Any buildup that does not completely melt	By buildup on wings
Any contamination of the surfaces is considered unacceptable	By change in color, reflectivity, or surface irregularity
Any contamination on the wing	By company reps who are deicing inspectors
Any snow adhering to the wing is not a good time to fly	By reflectivity & sheen
Any snow buildup	By viewing black stripe on wing from cabin area, color changes
Any snow buildup or snow adhering to aircraft surface forward of cockpit windows or on wings	By what can be seen from cockpit/cabin
Any snow sticking to surfaces or dulling of surface	Cabin observation
Any visual buildup	Can see snow building up
Appearance of "slush" type surface on top of wing	Can't
Appearance of dull patches instead of shiny surface	Cannot be determined accurately
Appearance of dull surface	Carry over times - buildup of snow on wings
Appearance of surface in question. Looks slushy	Chalky appearance, accumulation of snow
Appearance of surface of the wing	Change from a slick appearance to a dull grey/white color
Appearance of wing	Change from dull to shiny
Appearance; snow sticking to the aircraft	Change in appearance
Areas where the snow can be seen accumulating on the wing surface or fluid start to look "milky"	Change in color
As per instructions received in training	Change in color and accumulation
At the gate by sheen from window or/& by hand after gate departure by wing surface, sheen from window	Change in color and reflective quality
Based on snow accumulation or adhesion to wing surfaces	Change in color, more watery appearance
Becomes opaque	Change in color, viscosity for both, and surface accumulation
Becomes very slushy super saturated loss of shine	Change in fluid color/consistency. Appearance of frozen patches
Before taxiing into position a visual inspection	Change in surface texture/color
Begin to be less opaque, more slushy, color not as easy to make out, decal on wing no longer clear then fluid less shiny	Change in texture
Better here	Change in texture/color
Black leading edge of wing	Change in the apparent texture of the fluid
Black strip appears white	Change of color - Precip. buildup
Buildup (X 4 responses)	Change of color of applied surface and change of texture and reflective ability
Buildup - grainy	Change of color of fluid OR snow/ice actually sticking to surfaces of aircraft
Buildup - visual	Change of color/accumulation of snow on fluid
Buildup of contaminant	Change of consistency in the fluid, any buildup snow where there is no fluid

Check leading edge of wing. If boot which is black starts turning white then it's time to deice again

Check wing

Clearly see snow accumulating in the fluid

Clearness of the fluid. Opaque is failing, and clear is still good

Clouding/accumulation/"whitening" of corners

Cloudy

Cloudy - milky color

Cloudy appearance

Cloudy, grainy surface texture

Co-pilots determine as the Captain doesn't check

Collection of snow on wing

Color (**X 3 responses**)

Color & condition of snow - wing surface gloss or dull

Color & consistency of the fluid

Color & if I see some sluffing after taxi out

Color & texture & times lapsed

Color & texture of snow

Color and gloss of surface

Color and reflectivity of wing surface and fluid coating

Color change followed by crystallization w/w fluid membrane

Color change or slush

Color change, "lumpy" buildup, fluid no longer smooth

Color change, buildup of snow, etc.

Color change?

Color of fluid on wing

Color of fluid, amount of material on wings

Color on wing surface

Color or sheen

Color, accumulation, sheen of fluid

Color, time-amount of precip

Color/gloss/texture

Common sense

Company requires crew member check wings from a position inside the cabin. Check for change in color of fluid

Comparing pre- and post-deicing inspections of wing with pre-takeoff condition

Concentrated buildup & loss of glossy appearance to fluid

Condition of remaining fluid

Congealing of fluid

Consistency of fluid looks different when saturated

Contaminant on wing/change in color of fluid

Contaminate buildup

Contamination on wing surface

Continued accumulation of snow on top of deiced surface

Continued accumulation of snow with presence of deicing fluid minimum

Coverage of wing by snow

Crystal snow or ice observed on surface

Crystallization on surface

Depends on level of fall

Depends on type (1 or 2 & 4)

Depends on type of snow & temp. By holdover chart if wet snow

Depends on type of fluid

Depends on type used

Difficult at best unless wing surface can be visual closer than thru a window

Difficult on 747-400 - 2 man cockpit - rely on holdover time charts

Difficult since certain types of snow can mask the surfaces

Discoloration/change in sheen of fluid with snow remaining

Do not know

Do not know how to, rely on holdover charts

Does it stick?

Does not melt on wings, appears that liquid is accumulation snow & slush

Does the wing look dry from deicing fluid - I feel I have protection

Doesn't melt into fluid - lays atop fluid, as snow; rather than being absorbed

Don't - only time HOT

Don't have a good reference in memory-if in question, I either re-deice or check our manual

Don't know (**X 19 responses**)

Don't know - except when snow sticks

Don't really know - we go a lot by the holdover times

Dull appearance

Dull appearance

Dull appearance as opposed to shiny. We get very little training in this area.

Dull appearance of fluid or actual patches of snow

Dull appearance of fluid surface

Dull appearance of wing

Dull appearance or snow sticking and not melting

Dull appearance, snow or white accumulating on some or all areas of wing

Dull appearance/snow accumulates in areas on wing

Dull finish

Dull finish on the wing (buildup of snow or sleet)

Dull shine or lack of, uneven layering or thickness question

Dull shine to fluid if Type II or IV. Type I holdover times are to short to be used

Dull surface (**X 7 responses**)

Dull surface, white surface, less reflective surface

Dull, slushy look

Dulling and or accumulation of solids

Dulling appearance of the fluid on wing

Dulling of finish, snow buildup

Dulling of fluid

Dulling of fluid's reflectivity on the wing. Snow accumulating on wing surface

Dulling of fluid, losing reflectivity

Dulling of gloss on wing surface or accumulation of snow

Dulling of surface reflectivity

Dulling of surface reflectivity (loss of gloss) caused by gradual deterioration of the fluid to slush

Dulling of surface, loss of shine, snow collecting in spots on surface, freezing

Dulling of surface, snow or ice accumulation

Dulling of the gloss. Accumulation

Dulling of upper wing surface and increased roughness of surface

Dulling of wing surface, snow accumulation

Dulling or snow accumulation

Dulling, opaque, hazing of wing surface, and accumulation of FZ precip on wing

Dulling, snow accumulation on fluid

Dullness of fluid
 Dullness of fluid on wings. Buildup of snow on wings
 Dullness of fluid, accumulation of snow, areas of snow buildup
 Dullness of surface
 Dullness on wing with snow adhering to surface
 Dullness, visual accumulation of ice/snow
 Exceeded HOT or conditions worsen
 Exceeding hold over time and making a visual looking for snow accumulation on surface
 Exceeding holdover time
 Exceeding holdover times & accumulation
 Experience
 Expiration of holdover time
 Expiration of time and does it look like it has iced up (milky fluid)
 Failure indicated by wing not being shiny
 Failure of snow to melt into the liquefied layer of fluid
 Failure of surface to prevent accumulation and ice buildup
 First officer has this duty; but we are told to look for a glazy rough surface
 Flakes begin to show up/accumulate on wing
 Flakes look "sticky" - not being absorbed into the fluid
 Flakes no longer absorbed by fluid with discoloration/graying
 Flakes piling up; appearing granular as opposed to dissolving in fluid
 Flakes remain on wing without melting
 Flakes remain on wing/fluid
 Flat surface
 Fluid "looses glossy appearance"
 Fluid appears to run and does not adhere to the wing
 Fluid becomes dull
 Fluid becomes less shiny
 Fluid becomes milky. Very difficult to judge from aircraft
 Fluid becomes opaque - loses shine - snowflakes don't melt
 Fluid becomes opaque in color and becomes slushy
 Fluid changing to a milky color
 Fluid dull - no longer shiny
 Fluid gets lumpy cloudy
 Fluid has "milky" white color snow is sticking to wing, fluid has lost its "sheen"
 Fluid has milky color
 Fluid looking cloudy or building up on wing & accumulation around cockpit windows & nose
 Fluid looks dull & opaque
 Fluid loses "sheen", wing not so smooth, decal on wing becomes blurred
 Fluid loses glossy look
 Fluid loses its sheen - becomes dull
 Fluid loses its shine
 Fluid loses shine, no longer clear, appears opaque or slushing, actual snow accumulation
 Fluid no longer clear
 Fluid no longer has a glossy sheen
 Fluid no longer has glossy, shine/snow is adhering to surface
 Fluid no longer shiny. Dull patches showing
 Fluid no longer visible on wing & precip. is accumulating
 Fluid not dripping, visible snow standing on aircraft surfaces
 Fluid not shiny - dull snowflakes adhering and building up
 Fluid on observed surfaces becoming dull with a slushy look
 Fluid on wing turns from shiny to dull grey
 Fluid reflectivity becomes "dull" and may contain "crystal" like grains
 Fluid reflectivity/color patches of accumulated snow
 Fluid starts to become shiny
 Fluid starts to get on opaque appearance slushy look to it
 Fluid starts to lose its gloss
 Fluid takes on milky appearance
 Fluid turning dull, snow not melting
 Fluid turning more gray/opaque
 Fluid turns milky color, loses sheen
 Fluid turns milky from shiny
 Foggy, glazy look, reflective, thin
 Forward portion of deice boots covered with snow.
 External probe near cockpit & aircraft nose
 Fuzzy or cloudy look to deicing fluid
 Glaze over
 Glazed appearance
 Glazing and loss of sheen on wing/control surfaces
 Gloss
 Glossy
 Glossy appearance disappears. Snow collects on wing.
 Notice other a/c ahead of you
 Glossy is good to go
 Go back and check the wings for buildup
 Go back and look overwing, or if window cloudy have a ground inspection (hands on)
 Goes from shiny to dull
 Good question (**X 3 responses**)
 Graininess on upper wing
 Grains of snow building up on the wing
 Grainy sandpaper appearance and a dulling of shiny surface
 Granular appearance of wing surface
 Granular, coarse appearance
 Ground personnel accomplish an inspection, if any contaminants present we deice and depart prior to holdover time
 Guess (**X 3 responses**)
 Guess/experience
 HOT & guess
 HOT & observing how much if any is sticking to aircraft
 HOT expired and ice on snow accumulation on windshield wiper post
 HOT expired and snow sticking/building on windshield wiper posts/Top of radome. Viewed from cabin, snow starting to build on wing
 Hard to recognize with..... deicing fluid
 Hasn't occurred
 Have aircraft inspected prior to T/O
 Haven't looked: after deicing - if holdover time has not expired - we took off. Twice the time expired but it was not snowing at the time of takeoff
 Hazy hue
 Hazy surface - I don't feel I have adequate knowledge beyond the basics

Heavy accumulation
 Help!
 Hold over charts plus visual (X 4 responses)
 Holdover time/charts (X 7 responses)
 Holdover time expiration
 Holdover time expiration-followed by visual inspection from cabin windows
 Holdover time in relation to accumulation of precipitation on the wings
 Holdover time/accumulation
 Holdover time/visual inspection use of ground crew
 Holdover times in conjunction with dulling of surface sheen
 How much it has snowed and hold over time before t/o - final visual
 I believe it turns an opaque or whitish color
 I do not know, but I should. I will be researching this
 I don't. But I takeoff immediately after deicing, or re-deice
 I don't/can't. Rely upon HOT & visual check
 I guess if the snow doesn't melt, the fluid is failing
 I guess if the snow is sticking to the wing
 I have seen it actually fail and can recognize failure by looking at fluid on windscreen and wiper blades etc. as well as top of wing surface
 I look for a dull appearance of the fluid. Also if snow appears to be standing on the wing
 I look for re-accumulations of snow and/or areas of buildup/contamination that affect the surface of the wing for cont. surfaces
 I rely on the HOT tables, primarily, but it has not yet been an issue for me
 I would surmise that one can see "ice patches" forming in the deiced surface. Perhaps color difference
 Ice buildup on representative surfaces using hands-on or visual check
 Ice detector strip turns white
 Ice formation snow not melting on contact
 Ice or snow buildup
 Ice still present
 If I see ice crystal formation or dulling of fluid surface
 If I see snow adhering to wings
 If I see snowfall accumulating on the wing (Type I)
 If close to holdover time I have to send FO to cabin to inspect wings
 If have not left gate I feel the wing with my hand or look at wing from overwing window
 If holdover time is exceeded I assume fluid failure (if in precip)
 If holdover time were to expire 1) FOs observation 2) if at night, or if ground personnel available would return to deice pad
 If it adheres to wing can't go
 If it is not adhering to the surfaces
 If it looks white, it's failed or loss of gloss
 If it sticks or not
 If it sticks, it's failing
 If it's sticking/if hazy appearance
 If snow absorbs quickly and wing is shiny not dull
 If snow appears to be collecting on the wing, the fluid has failed
 If snow begins to accumulate on the wing
 If snow is accumulating and not melting
 If snow is accumulating on the wing surface even after deicing
 If snow is not melting, on surface
 If snow is sticking to the upper surface of wing
 If snow start accumulating on wing
 If snow starts collecting on surface - surface starting to turn opaque
 If snow sticks or crystallizes on surface of fluid - turns dull looking
 If snow sticks to wing
 If surface does not have glossy sheen or snow accumulating on surface
 If surface looks rough or slugh
 If the snow appears to be sticking to the surface of the wing, or if ice is on the windscreen
 If the snow is starting to stick and/or some reflectivity is decreasing
 If the snow is visible on the wing, i.e. the wing is not shiny, then fluid has failed
 If there is any roughness or anything other than smooth fluid
 If wing starts to change in color
 If wing turns white
 If you can see out the window and it is NOT NIGHT, when a crust forms on top of the wing holding snow that does not melt
 If, during taxi for takeoff following deicing HOT is exceeded, I'll do an inspection. If any contamination is seen, we'd go back for more fluid, If clear, good to go
 Induction of white flakes on wing or dulling of surface shine
 Inspection by ground personnel after holdover time has been exceeded
 Inspection of wing surfaces from cabin window
 Irregular surface from snowflakes
 Is it adhering to the nose, melting or has fluid failed
 Is it sticking - is it accumulating
 Is snow becoming slushy on wing
 It sticks
 It's sticking
 It's very hard to see outside the a/c windows especially at night with fluid on them.
 Just a guess. Take a look at the wings
 Just look for appreciable accumulation
 Lack of

Less reflective/dulling of surface or appear white with random snow accumulation	Loss of gloss, beginning of accumulation
Little or no absorption rate/loss of shiny surface	Loss of gloss, fluid changing to milky color
Look	Loss of gloss, turns milky
Look at it	Loss of glossiness on surface
Look at representative surfaces, holdover time look at the wing, call for external inspection if in doubt	Loss of glossy appearance & accumulation of snow on surface
Look at the wing before takeoff	Loss of glossy appearance/accumulation of contaminants
Look at top of wing (forward portion) near boot area. Black boot gives good contrast	Loss of glossy look on wing upper surface
Look at wing	Loss of glossy sheen or snow flakes remain on wing surface without melting
Look at wing. If snow is visible or surface has lost reflectivity	Loss of glossiness. Dull appearance. Snow on wing
Look at wings	Loss of iridescent look on wing
Look at wings & determine if it is collecting w/o melting	Loss of reflective (glossy) appearance
Look at wings from inside airplane	Loss of sheen/shine (X 4 responses)
Look for a smooth shiny surface	Loss of sheen - opaque buildup
Look for area of snow accumulation on wing surface	Loss of sheen or glossiness. Snow sticking to surface
Look for deice fluid absorption of all snow	Loss of sheen, guess estimate of amount of H2O being introduced to fluid by precip.
Look for disruption on wing	Loss of shine, surface becomes dull & rough
Look for dull surface	Loss of shine/gloss on upper surface
Look for glossiness or snow sticking on nose or leading edge	Loss of shiny appearance of fluid
Look for ice buildup	Loss of shiny look on wing surface
Look for signs of accumulation on wings	Loss of shiny surface - becoming opaque
Look for snow accumulation on wing	Loss of shiny surface on wing
Look for snow buildup of loss of shiny surface	Loss of shiny/glossy look
Look for snow on the wings from the cabin	Loss of wet appearance clumping of ice/snow on surface
Look for snow on wing	Lots of snow
Look out pass. window over wings	Lots of snow piling up
Looking at front nose area of a/c	Melting of snow with wing contact us. Melting & re-freezing
Looking at the aircraft in front of me	Melting stops, snow builds up
Looks cloudy or milky	Milky appearance to fluid
Looks like slush	Milky/hazy color of fluid
Looks white, not reflective (if you can see out the window. See above)	Moderate or heavy & holdover times and type fluid. If able tactile inspection of wing for a "gut feeling" sense of saturation
Looses its shine	More snow than liquid, bumpy surface
Looses shine, buildup of precip	Mostly by holdover times
Loosing shine, snow adhering	Must do visual on wing
Lose glossy shine, snow begins to stick to surface	My own opinion
Loses its "shine" becomes "dull"	My personal opinion - if the holdover time has expired-get deiced again
Loses shine	N/A (X 2 responses)
Losing sight of wing surface & no run off of snow	Need more info - Co. lacking in distributing necessary info ref. this subject!
Loss "wet" look	Never trained to suspect fluid failure(X 2 responses)
Loss of "glossy" surface (dulling of surface)	No (X 2 responses)
Loss of "shininess" of fluid; standing snow on wing	No clue-other than shiny wing surface will dull with saturation
Loss of "shinyness" to reflected light	No glossy appearance
Loss of "wet shine" look and/or HOT	No ice or snow on aircraft
Loss of anti-icing fluid "sheen" - buildup of snow	No idea (X 3 responses)
Loss of clear shiny appearance becomes milky	No idea - I just look for the shiny coating with the color of the day
Loss of fluid shiny quality roughing of the wing surface	No longer shiny (X 2 responses)
Loss of glaze/snow forming	No more glaze - buildup
Loss of gloss/glossiness (X 4 responses)	No training given
Loss of gloss (i.e. dulling of surface reflection). Accumulation of any snow/slush	No visual accumulation of snow on rep surfaces
Loss of gloss - fluid looks slushy	No-experience
Loss of gloss - non-uniform appearance	Non smooth surface, non-shiny surface
Loss of gloss on fluid	Not adequately trained to recognize failure
Loss of gloss on wing or impact snow building on leading edge	
Loss of gloss, accumulating snow	

Not assimilated by Type II/IV, recognizably no change in observation if Type I

Not glossy-white, milky appearance

Not had any specific training

Not melting (**X 2 responses**)

Not reflective, dull, whitish, with snow accumulation

Not sticking

Not sure (**X 2 responses**)

Not sure - but if a significant amount is accumulating on the wing I would get re-deiced

Not sure the term "fluid failure" is understood. Have never seen this before and I might have it confused with another term. Would have like if you defined it in your opening statements

Not very well

Not very well, Buildup of snow on wing

Not very well. Use times from table and make an intelligent decision from present weather conditions

Note buildup amounts

Notice buildup of snow on top of deiced wing

Noticeable accumulation forming on wing surfaces

Noticeable accumulation on wing surface

Observation

Observing visible surfaces for breaks in continuity of smoothness

Obvious snow on wing, surface dulling

Once it all starts to accumulate in on even amount over the wing

Only after accumulations are seen on the wing

Only by exceeding HOT

Only know by visual accumulation

Onset of buildup

Opaque color (**X 2 responses**)

Opaque color not shiny anymore, shows depth

Other than exceeding HOTs & having surface COVERED with snow/ice/ice pellets, am unsure how to recognize fluid failure

Outside surface inspection by ground crew

Over wing in cabin/color or accumulation - VERY DIFFICULT

Patches of snow accumulating on top of wing surface

Patches of snow accumulating/loss of anti-ice material on wing

Patches of snow adhering to fluid (Type II)

Patches of snow begin to appear on wing surface

Patchy dull shine

Patchy snow accumulation or dullness (loss of reflectivity) of fluid on wing

Pink Type II & IV now white

Pre-contamination check/look for snow not melting when it hits wings

Pre-flight: by touch. Taxi: by visual inspection of illuminated wing upper surface

Pre-takeoff check of leading edge from obscured window or pre-takeoff contamination check from pax window

Precip buildup

Precip doesn't dissolve anymore (slush on leading edge)

Precip sticky to surface

Precip. adhering to leading edge surface

Precipitation accumulating. Loss of gloss or reflectivity of deicing/anti-icing fluid

Precipitation accumulation on a surface

Precipitation stick to aircraft

Presence of any snow on the wing & by observing any buildup on deiced areas

Presence of smooth surface tension

Presence of snow on wing i.e. not wet with fluid

Presence of snow on wing indicated by white color, versus color of wing

Presence of snowflakes on surface

Progressive surface freezing or snow accumulation on top of fluid

Raise the roll spoilers to see if snow adheres to the a/c or slides off freely

Random accumulation of precipitation on wings

Rapid melting and no accumulation of snow

Rate & consistency of snow falling

Re sticking

Re-accumulation

Re-inspection of the wing prior to takeoff

Recollection of snow on deiced surfaces

Reflectivity

Reflectivity and accumulation

Reflectivity of fluid & contamination buildup

Rely on holdover time table

Resumption of snow accumulation on surfaces

Rough texture, HOT

Rough wing surface or visible snow

Rough/no shine

Rough/non-reflective surface

S/O's duties - not Captain, however, if snowfall has covered wing surfaces - I would say the fluid has failed

Snow accumulation on wings - visual inspection

Snow adhering to aircraft

Snow not melting as it lands & lack of a shiny surface

Snow on the wings

Snow or ice buildup

Snow sticking to surface (accrual)

Snow sticking to wing

Same as definition

Saturated fluid on flat surface

Saturation of snow on surface with fluid not melting snow & allowing snow to "roll" off surface

Scientifically you cannot

See snow (**X 2 responses**)

See snow accumulate

See snow accumulating on wing or led's

See snow adhering to wings or other surfaces

See snow flakes stick in form

See white or opaque film forming on wing

Sheen, clarity

Sheen, gloss gone

Sheen, granulation, reflection, amount of snowfall since deicing (on the ground, etc.) buildup

Sheen/glossiness of surface

Sheen/texture/accumulation

"Sheen" or lack of same

Shiny

Shiny surface appears dull & cloudy - when in doubt - re-deice

Shiny surface on edge of wing or accumulation

Shiny surface turns dull looking	Snow adheres to wing & milky color change - loss of gloss
Shiny vs dull	Type IV
Show sticking to upper wings	Snow adhering after/during taxi. Dull finish
Significant accumulation	Snow adhering on deiced surface?
Skidding of snow on wings	Snow adhering to surface/wing/aircraft (X 17 responses)
Slight change in color and opaqueness for both a) & b)	Snow adhering to and not melting when hitting a/c surface
Slush appearance on wing or other surfaces	Snow adhering to surface - not melting
Slush buildup(X 5 responses)	Snow adhering to the wing in frozen state
Slush/snow accumulation on visible wing surface	Snow adhering to wing and not melting - accumulation
Slushing/snow accumulation/dulling	Snow adhering to wipers & windshield - then check wings to see if it is "sticking"
Slushy appearance	Snow adhering, ice forming
Slushy appearance of fluid/loss of "shine"	Snow appearing on surface
Slushy features	Snow appears on surface or surface is dull
Slushy look	Snow appears to and actually begins accumulating. Surface color & shine/glossy texture dulls
Slushy or dull appearance to the surface	Snow beginning to stick to surface
Small patches of snow adhering to the wing and changes in color	Snow beginning to stick to surface again after holdover time
Smooth glossy surface becomes textured	Snow begins adhering to sprayed surfaces
Snow "piles" up - doesn't melt	Snow begins to accumulate [on wing] (X 6 responses)
Snow - appears to melt into fluid becomes more fluid	Snow begins to buildup/loss of sheen
Snow NOT melting or turning to ice on surface of a/c. Best to get external inspection (hands-on)	Snow begins to cause the wing surface to lose the gloss look
Snow accumulate and fluid becomes dull	Snow begins to stack up on the wing
Snow accumulates/accumulation [on wing] (X 33 responses)	Snow begins to stick and not dissolve
Snow accumulates and stays opaque and white	Snow begins to stick/wing loses its shiny-wet appearance
Snow accumulates on top of fluid, loss of glossy/appearance	Snow being visible in the fluid on the wing
Snow accumulates on wing with just Type I	Snow buildup [on wing] (X 21 responses)
Snow accumulating in failure area	Snow builds up & accumulates on the wing
Snow accumulating on black leading edge of wing	Snow builds up rapidly
Snow accumulating on wings, fluid beginning to act saturated	Snow buildup &/or visibility of wing surface areas is obscured
Snow accumulating that won't shear off	Snow buildup - loss of glossy appearance
Snow accumulation (rather than dissipate)	Snow buildup - no longer shiny smooth surface
Snow accumulation - the deice boots turn white	Snow buildup in a slushy form on wing
Snow accumulation and buildup on wings upper surface > fluid not breaking down snow on wing	Snow buildup on nose or wiper blades, cannot see the wings from the cockpit. Fluid takes a grey look
Snow accumulation on top of fluid	Snow buildup on surface of anti-icing fluid
Snow accumulation on top of fluid	Snow buildup on the wing after deicing
Snow accumulation on top of fluid - dulling of surface reflectivity	Snow buildup on wing. Loss of glossy appearance of fluid on wing
Snow accumulation on top of fluid, dulling of surface reflectivity	Snow buildup, viewed from cockpit and/or cabin
Snow accumulation on top of fluid. Random snow accumulation	Snow collected on wing
Snow accumulation on top of the fluid	Snow collecting
Snow accumulation on wing or surface appears dull	Snow does not "disappear" from the wing but builds up
Snow accumulation on wing surfaces - time limits exceeded	Snow does not melt
Snow accumulation on wing/or unprotected windshield	Snow does not melt and start to stick to the wings
Snow accumulation on wings and surfaces of fuselage	Snow does not melt and starts to turn surface milky or loses shiny appearance
Snow accumulation or loss of reflectivity	Snow does not melt and wing not shiny anymore
Snow accumulation or sticking	Snow doesn't disappear
Snow accumulation with mostly white tone	Snow doesn't melt
Snow accumulation, dull surface	Snow doesn't melt/appears to stick to upper wing surface
Snow accumulation. Dull appearance	Snow drifts on wing
Snow accumulation/loss of gloss	Snow fall accumulation
Snow accumulation/no shine on surface	Snow flakes appear on wing
Snow adheres and does not liquefy	Snow forming on surface
	Snow is adhering to wing to the point you can see it as it happens
	Snow is not absorbed by the fluid on the wing

Snow is not melting - can see flakes on representative surface

Snow is not melting when landing on a/c. Fluid loses its glossy appearance

Snow is not turning to liquid soon upon fall to wing

Snow is sticking or visible

Snow layer visible on wings

Snow laying on the fluid

Snow lingers on surface, does not melt right away

Snow maintains appearance, accumulation

Snow melting & shiny surface

Snow melts & no accumulation

Snow melts, fluids stay clear

Snow no longer absorbed by fluid

Snow no longer appears to take on the wet look of the deicing fluid

Snow not absorbed into fluid

Snow not adhering to wing surface?

Snow not dissolving on wing

Snow not immediately being absorbed into the fluid.
Snow/slush evident on wing and wing appearing dull vs shiny

Snow not melting

Snow not melting & starting to accumulate

Snow not melting on contact

Snow not melting on contact and a glazing or less reflective appearance

Snow not sticking

Snow on black stripe

Snow on top of fluid

Snow on top of fluid, random snow accumulation dulling of fluid

Snow on wing [surface] (X 13 responses)

Snow on wing & nose

Snow on wing or turning to slush on wing

Snow or freezing rain remain on wing surface

Snow or ice on unheated windows around cockpit

Snow or slush appears in the liquid

Snow or slush being present on the wing

Snow or slush like appearance adhering to the wing surface

Snow patches

Snow physically accumulating on the wing deice boot of front nose of the a/c

Snow present on wing or dulling of fluid

Snow remaining on wing

Snow remains intact

Snow remains on wing and does not dissipate

Snow remains white and in frozen state

Snow retains its shape/color/form after falling on control surfaces

Snow sitting (unabsorbed) on the fluid

Snow starting to accumulate on the wing

Snow starts to accumulate

Snow starts to accumulate & stick

Snow starts to adhere

Snow starts to adhere to the wing & visible surfaces

Snow starts to stick

Snow stays on wings/nose

Snow stays visible. Fluid frosts

Snow sticking [to surfaces/wing] (X 13 responses)

Snow sticking by visual inspection

Snow sticking in scattered areas or clumps

Snow sticking or a matted (no gloss) to surface

Snow sticking to a/c leading edge and engine intake

Snow sticking to deiced surfaces

Snow sticking to surface and remains in snow form

Snow sticking to wing in leading edge area

Snow sticking to wing surface visually

Snow sticking to wing surfaces, glazed areas mixed with dull areas

Snow sticking, not melting and the sheen is gone

Snow sticking/accumulating on wing surface

Snow sticking/showing on top surfaces

Snow sticks to a/c surfaces & doesn't disappear/melt right away

Snow sticks to surface and/or accumulated on wings. If HOT expires you deice again

Snow sticks to surfaces - does not melt

Snow sticks to wing & shows

Snow sticks/ice forms

Snow visible in deice fluid

Snow visible on surface of aircraft

Snow visible on top of wing

Snow visible on wing (this is hard to detect and is a problem)

Snow will adhere & buildup again on surface. Also surface appears dull with failure of fluid

Snow will not melt

Snow will start to accumulate

Snowfall accumulation

Snowfall accumulation on leading edge/upper surface of wing

Snowfall adheres (does not melt)

Snowfall is adhering to wing

Snowflakes are starting to accumulate on surface

Snowflakes attaching to wing upper surface

Snowflakes can be seen accumulating on the surface without melting - white

Snowflakes do not melt on contact with surface & lack of shiny surface

Snowflakes don't disappear on wing contact

Snowflakes intact resting on top of fluid without melting

Snowflakes not melting in the fluid

Snowflakes not melting into fluid surface

Snowflakes sticking to fluid instead of melting/surface loses shine

Splotchy effect of dissipation - melting not occurring

Spots on surface

Stagnant accumulation

Standing snow or ice. This may be due to fluid failure or something else

Start of accumulation on wing, flakes no longer melt upon contact with wing surface

Start to see slush on surface and/or small patches of white unmelted snow

Starting to accumulate on wing

Starts sticking

Starts to accumulate

Static accumulation of snow or melted snow (slush)

Static contamination buildup; conditions! Conditions! Conditions!

Sticking snow

Sticking snow not melting away and starting to buildup	The snow is recognizable as such on wing i.e. doesn't disappear into fluid
Sticking to a/c on left wing	The snow is visible on surfaces not being "absorbed" by the fluid
Sticking to surface	The snowflakes don't absorb into fluid. The glossy sheen normally seen on a deiced wing loses its shine, or becomes opaque
Sticking to surface on pre-contamination check	The surface becomes dull & snow begins to buildup on wing
Sticking, buildup	The surface of the wing becomes dull
Sticking, no "breakthrough" of fluid bubbles, no sliding off	The upper wing surface is no longer shiny (loss of gloss) or snow is building up
Stuff on wing	The wing no longer appears to be wet, glossy, smooth
Subjective assessment against no known standard. Expired holdover time equals failure	The wing surface begins to dull
Subsequent accumulation of snow/ice	The wings start to get white
Surface becomes dull/non-reflective	This is very subjective. Color
Surface begins to look dull, opaque	Thixotropic characteristics of the fluid
Surface distortion	Time
Surface dulling	Time & fluid appearance
Surface gets white (snow)	Time & visible snow accumulation
Surface is not longer slick and shiny	Time and/or accumulation (not melting at contact)
Surface looks matted	Time, character of wing top surface, guess
Surface loss of waviness of fluid	Top of wings, leading edge dull & white
Surface no longer glossy	Try to see if any accumulation is visible
Surface of fluid dulls. Snow begins to accumulate on the surface of the fluid	Turning dull as it hits the fluid
Surface of wing displaying a dull finish, vs a gloss finish when fluid is fresh	Turns dull
Surface other than smooth & glossy	Turns dull chalky color
Surface reflectivity changes, sheared fluid	Turns dull/snow accumulation
Surface texture & shiny appearance	Turns glossy
Surface texture as compared to what a "clean" wing looks like	Turns grey and mushy
Surface treated no longer appears glossy	Turns white?
Surface turns white	Type I any contamination - Type IV best guess considering snow fall rate
Surfaces are losing gloss and turning white or flakes remain on surface	Type I fluid will lose its glossy sheen
Surfaces are losing their gloss and turning white on snowflakes not melting	Type II - lack of clean smooth surface - no acculan. Type IV the settling out of frozen precip - very difficult to access
Surfaces become less reflective or dull, or appear white with random snow patches	Type II or IV loses its color as snow builds up
Surfaces losing gloss & turning white or snowflakes don't melt	Type II starts to look very cloudy & snow tends to setup on fluid - haven't seen Type IV
This is a survey - keep it that way	Type fluid/time chart
Time, texture, color	Type of snowfall (wet or dry) and the effect of its appearance on wing loss of shine of deice fluid into dull/hazy spots or the whole surface
Tactile (from opening sliding window) combined with visuals	Unable to see fluid
Tactile and/or visual test	Unable to see surface underneath fluid
Tactile test of wing surface	Unable unless other than light snow
Take a guess	Unknown (X 5 responses)
Texture & color of fluid	Upper leading edge of wing deice boot and nose area forward of windshield. Fluid gets very dull and washed out
Texture (pebbles look) actual snow adhering	Upper wing appearance
Texture becomes grainy	Upper wing has a glazed over look; dull instead of shiny
Texture of fluid on wing - goes from fluid smooth to dull, grainy or frosted look	Use holdover time and visual inspection
Texture of wing surface	View designated area for failure
That there appears to be no snow visible on wing SFC	View through designated viewing position through window
The change in color of the fluid and the rate which the precipitation dissipates when it falls on fluid	Viewed surface appears dull or shows snow accumulation
The dulling of the treated surface as contamination builds on the surface	Visible accumulation
The fluid looks clumpy	Visible accumulation on surface
The glossy fluid should start to look opaque	Visible accumulation on wing
The look of the fluid on the upper surface of the wing and if there is accumulation on the wing	Visible buildup on wing surface (X 5 responses)
The nature of the precip on the wing	

Visible frozen precipitation on wings
 Visible snow [on surfaces] **(X 5 responses)**
 Visible snow on wing - snow not absorbed by fluid
 Visible snow on wing/loss of glossy look on fluid
 Visual **(X 6 responses)**
 Visual - reflectiveness of fluid Type II
 Visual - snow adherence to a/c surfaces
 Visual accumulation
 Visual and tactile
 Visual appearance
 Visual appearance of wing (accumulation of snow)
 Visual buildup
 Visual buildup on wing surfaces & loss (sheen) of gloss to fluid
 Visual cabin window overwing - also visual on other a/c or ground equip.
 Visual check/inspection **(X 11 responses)**
 Visual check if over holdover time
 Visual check prior to departure. Any buildup!
 Visual condition of wing surface
 Visual guess
 Visual inspection from inside a/c
 Visual inspection - contamination evident
 Visual inspection after holdover time expires
 Visual inspection and judgment based on experience
 Visual inspection by iceman
 Visual inspection of a/c surfaces to determine whether or not snow is adhering
 Visual inspection of accumulation
 Visual inspection of the upper wing surface
 Visual inspection of wing from cabin - looking for contaminants adhering to wing
 Visual inspection of wing surface and tactile if necessary
 Visual inspection of wings from cabin
 Visual look at wing
 Visual look/time
 Visual sighting of snow on surfaces
 Visual snow on top of fluid if you can see out the window with deicing fluid run down the side of it - Superman -
 Visual wing check from cabin out window to black stripes
 Visual wing inspection
 Visually **(X 5 responses)**
 Visually & holdover time
 Visually & with timed holdover charts
 Visually by F/E report to PIC
 Visually checking the wing from cabin
 Visually from 3rd exit fwd emergency exit
 Visually inspect wing
 Visually inspecting wing surface from cabin not sure what failure of fluid looks like
 Visually see buildup-however since becoming a Capt. years ago haven't made many trips back to observe wing-F/O does it-but in each case would expect see defined buildup precip. on wing
 Visually see if ice is forming
 Visually, look at left wing watch for a buildup of snow, wing becomes a dull color, reflective indicator on wing
 Visually-milky surface-.... (precip) is not melting in anti-ice fluid
 Visually/holdover/experience
 Volume of precip accumulation
 Wing is not shiny
 Walk around
 Walk back & look out at the wing
 Walk back inspect the wings for buildup
 Watch accumulation - on a/c fuselage/wings
 Watch for loss of smooth surface
 Watch proceeding aircraft wings
 Watch the snow hit the wing. If it melts right away and the fluid is not too milky looking I assume it is okay
 We've had no training
 Wet, shiny appearance of upper wing surface no longer exists
 Wetness of wing
 When color appears pale - no longer can see any sheen on surface
 When designated areas begin to amass snow accumulation
 When flakes begin to NOT dissolve, fluid becomes "lumpy"
 When flakes begin to settle on fluid and not immediately disappear, combined with CONSERVATIVE use of holdover tables
 When fluid becomes saturated the snow (Type II) will not sit on top but melts or freezes upon contact
 When ice begins to form
 When ice/precipitation freezes to the wings
 When it starts to accumulate
 When it sticks? Really don't know
 When looking and the wing and we start to see slush or snow building, in my mind this would be a failure of the de/anti-icing fluid & we would have to de-ice again.
 When snow begins to adhere to the a/c
 When snow begins to stick to the leading edges of wings & engine
 When snow is visible on represented surfaces
 When snow no longer melts into fluid. This has not happen to me in last 3 years
 When snow remains virtually intact and adheres to surface-doesn't melt on contact
 When snow starts accumulating
 When snow stays on top of fluid/wing
 When snow stops turning to slush/melting on contact with aircraft surfaces
 When the deiced/anti-iced leading edges lose their shine and become dull
 When the flakes don't dissolve into the fluid at a rate equal to the precipitation
 When the fluid no longer looks "wet" not glossy
 When the shine disappears from the fluid & some of the snow begins to adhere to surfaces
 When the surfaces lose their gloss and turn white or snow flakes remain on the surface without melting.
 When they become less reflective to the eye, or appear white with random snowfall
 When wing does not look completely "wet"
 When you see snow accumulating
 Whether the snow melts & or adheres to the wing to create an opaque look
 Which type??? Snow buildup, fluid separating

While on ground combination of: HOT, intensity of snow,
lighting conditions, visual inspection of wings & other
aircraft (mostly subjective)

White coating of snow adhering to fluid

White coating on leading edge. Loss of shiny appearance

White color

White color of the surface, dull versus shining surface

White hazy surface

White snow accumulation

White snow on surface

White surface on top of gel

Wind does not move precip

Wing appearance

Wing becomes shiny

Wing buildup

Wing changes appearance from wet to milky

Wing color turns opaque when saturated

Wing developing a whitish color

Wing goes from shiny to opaque

Wing inspection

Wing looks "clumpy" with snow. Windshield restricted by
snow

Wing loses its glossy appearance looks dull

Wing loses wet glossy look

Wing loses shiny appearance, turns white

Wing no longer looks smooth and shiny. Begins to look
milky

Wing not shiny, snow sticking

Wing should be shiny

Wing surface becomes dull and/or snow begins to buildup
on wing surface

Wing surface becomes dull can see snow collect without
any change to color or texture of snow

Wing surface fluid losing its sheen

Wing surface losing its gloss and turning a milky white
color, or snow sticking to wing

Wing surface no longer glossy/shiny, taking on a dull
finish

Wing surface start to lose shine or sheen and turns white
due to buildup of snow

Wing turns white (**X 2 responses**)

Wing turns white or loses its shine

Wing, losing its glossy sheen, contaminants "stick" to wing

Wings continue to present a smooth surface, with snow
melting during contact

Wings start to lose their "sheen" - slight
dullness/opaqueness to film

With difficulty

With fluid failure, the snowfall sticks to the a/c instead of
sliding off

With the clock and the look of the representative surface

C5b. How do you recognize failure of de/anti-icing fluid during freezing drizzle/rain or ice pellets?

Number not responding	331	(21%)
Number responding “?” , “Don’t know” or similar response	110	(7%)
Number with valid response	1,133	(72%)

Responses to question:

"Thin" or "clearing" of wing coating. Accumulations on other a/c & unheated surfaces of my one a/c
(Same for ice pellets) Subtle change in surface appearance
1. Holdover time 2. Visual inspection of wing surface
? (X 22 responses)
? - a shiny wet look - how does that differ from normal deice fluid
? Mush?
? Tough to tell - usually check wipers, spinner
???Looks appearance???
A discoloring of wing area
A dulling of the surface, roughness, snow accumulation, lack of transparency but more dependent on holdover times
A dullness or opaque condition of the fluid
A function of experience
Absence of fluid & fluid color
Absence of smooth glossy sheen on wing, leading edge
pneumatic boots are helpful because their black color provides good contrast
Accumulating precipitation
Accumulation (X 12 responses)
Accumulation & color
Accumulation and failures of pellets to move off of surface. Freezing rain gets "slushy" look
Accumulation and/or re-freezing
Accumulation at the back edge of the deicing boot
Accumulation evident
Accumulation of ice(X 2 responses)
Accumulation of ice on wing no deicing fluid present or being absorbed by drizzle, rain, or pellets
Accumulation of snow/ice on wing
Accumulation on a/c then check wing
Accumulation on black surfaces
Accumulation on control surfaces
Accumulation on left wing
Accumulation on nose, wipers, windshield, hands on inspection from outside aircraft
Accumulation on surfaces with the help of surface shading of the tope of the wing
Accumulation on wing and/or windshield
Accumulation on wing (X 6 responses)
Accumulation on wing and/or interruption of the viscosity of deicing fluid
Accumulation on wings and also windshield
Accumulation on wings and/or dullness of surface
Accumulation on wings and/or leading edge, visual inspection
Accumulation or wing icing indicators
Accumulation rate changes dramatically

Accumulation, precip not melting, discoloration of viewing areas on wing but it is much harder to check
Accumulation/ground personnel
Accumulations seen on the front window, wipers or wing
Activate boots
Actual buildup
Adherence to wing surface
Adhering to a freezing on wing surfaces
Adhering to a/c surfaces
Adhering to windshield
Adhesion of particles
Adhesion to surfaces
After HOT, request another hands on inspection
After expiration of holdover time, visual inspection from cabin
Again, I would look for a "clean wing"
Aircraft grounded in most instances
Almost impossible
Almost impossible at night or day for drizzle or rain. Ice pellets that do not disappear as they strike surface are suspect
Almost impossible. Any who says they can tell the difference in a gloss to dull appearance is a liar
Also chalky but much harder to tell
An opaque look
Any "accumulation" on wing surface
Any accumulation which stays in solid state
Any accumulation/change in reflection
Any adhering to the wing
Any contamination of the surfaces is considered unacceptable
Any contamination on the wing
Any frozen particles on the wing
Any ice accumulation
Any ice adhering to surfaces
Any ice like surfacing or questionable buildup
Any ice on the wing is also not a good time to fly
Any show of accumulation
Any snow sticking to surfaces or dulling of surface except must take extra precaution
Appearance
Appearance of dull surface
Appearance of fluid dissolving
Appearance of fluid on wing and if it is running off during taxi
Appearance of opaque or frost on deice strips on wing
Appearance of wing surface visually
Appearance of wings
Areas of precip with tears in the protective fluids
As per instructions received in training
At the gate by sheen window or/& by hand after gate departure by wing surface, sheen from window
Attachment of ice on wing
BY reflectivity & sheen
Based on snow accumulation or adhesion to wing surfaces
Be overly cautious. This is the worst condition in my mind as it can freeze in irregular shapes on the wing
Before taxiing into position a visual inspection. It is near impossible to see freezing drizzle on a wing specially at night

Being to be less opaque, more slushy, color not as easy to make out, decal on wing no longer clear then fluid less shiny plus fluid washed off wing

Black stripe on wing obscured/changing clarity

Buildup [of contamination] (**X 6 responses**)

Buildup - visual

Buildup around windshield wipers

Buildup of ice and wing does not shine anymore

Buildup of ice/snow on wings and visible areas around windshield, and full surfaces during preflight

Buildup of icing on the wing. Wing surface is no longer shiny and smooth

Buildup of rough surface

Buildup on fluid/wing

Buildup on leading edge of wing - Ice or icicles on trailing edge of wing

Buildup on surfaces/wings (**2 responses**)

Buildup or glossy sheen

Buildup or milky appearance

Buildup over painted strips & visual inspection by ground crew in suspected

Buildup, rather than run off

By appearance of crystals on surface and discoloration

By change in color on surface irregularity with hands-on-wing inspection when in doubt

By company reps who are deicing inspectors

By holdover time

By leaving side window heat off & seeing if rain starts to freeze on it

By looking at ground equipment and other aircraft

By shiny appearance & distortion of pointing on wing - need decals on wings! on B727 like DC9 has

By touching

By viewing unheated cockpit window and by putting hand out window on aircraft skin

By what can be seen from cockpit/cabin

Cabin observation

Can see the frozen precip sitting on the surface

Can't have to use holdover times

Can't in FZ, buildup in ice pellets

Can't see the wavy lines/ridges of the fluid moving

Can't tell

Can't tell much difference than snow

Can't tell without hands on surface

Can't, not allowed to depart after HOT

Cannot be determined accurately

Cannot recognize under every condition due to glazing of surface in many instances

Cannot takeoff in those conditions

Carefully/ice forming on surfaces

Carry over times - buildup on wings

Change from a slick appearance to a grainy grey appearance

Change from dull to shiny

Change in appearance and accumulation at material on the wings

Change in color (**2 responses**)

Change in color and amount of accumulation

Change in color and reflective quality

Change in fluid appearance

Change in fluid color/consistency. Appearance of frozen patches

Change in look (shiny or dull) at wing root tough on viewing area (2 different styles used on DC9)

Change in reflective properties of previously deiced wing

Change in sheen - difficult to impossible to tell

Change in surface texture/color

Change in texture on the wing surface

Change in texture/color

Change in the look of wing surface

Change in wing appearance

Change in/loss of color of de/anti-icing fluid

Change of color of fluid OR snow/ice actually sticking to surfaces of aircraft

Check wing

Checking wing with pole

Clear - shiny areas on wing

Clear ice buildup

Clear ice buildup on black of deice boots

Clouding/accumulation/"whitening" of corners

Cloudy fluid

Coarse surface of wing; as opposed to being smooth

Coating/buildup

Collection of debris on wing plus snow melts & or adheres to the wing to create an opaque look

Collection of ice/slush on the top of the wing

Color (**3 responses**)

Color & consistency of the fluid

Color (loses shining appearance)

Color and gloss of surface

Color and reflectivity of wing surface and fluid coating

Color change (**3 responses**)

Color change followed by transparency w/w fluid saturated areas

Color change, buildup of snow, etc.

Color change, loss of shiny surface appearance

Color change/accumulation

Color changes to no color

Color of fluid

Color of fluid, amount of material on wings

Color, texture & time

Color, time-amount of precip

Color/feel

Color/gloss/texture

Color/texture change

Common sense (**2 responses**)

Company requires crew member check wings from a position inside the cabin. Check for change in color of fluid

Comparing pre- and post-deicing inspections of wing with pre-takeoff condition

Condition at airport along with exposure - HOT

Condition of remaining fluid

Congealing of fluid

Consistency

Contamination buildup

Contamination in freezing drizzle I rely on holdover time being accurate

Contamination on wing surface

Contrast between black painted & silver wing surfaces

Could only be detected by manual sliding detector pole
overwing areas

Crusting

Crusty appearance or buildup of precipitation

Crystal snow or ice observed on surface

Deice fluid beginning to gel

Deice fluid washed off a/c or diluted to clear consistence

Deicing fluid begins to lose its fluid gel-like look (Type II)

Depending on the "HOT" and the type/rate of precipitation

Depends on type of fluid

Difference in texture

Difficult

Difficult some times. Ice forming, sometimes glare of
lights can help see ice

Difficult vs holdover time

Do not know

Do not know how to, rely on holdover charts

Do not takeoff unless I have had Type IV and well within
our HOT. One company's policy in freezing drizzle
rain is no takeoff

Do not takeoff when this precip is falling

Does not lose glossy shine must accomplish T/O before
HOT expires

Don't fly

Don't fly in these conditions any more!

Don't go

Don't know (**21 responses**)

Don't know - unless it sticks

Don't know other than by actually touching surfaces

Don't operate in freezing rain

Don't takeoff in these conditions

Dull appearance (**3 responses**)

Dull appearance/elapsed time

Dull areas instead of shiny fluid on wing

Dull color of fluid

Dull finish (**3 responses**)

Dull fluid

Dull grainy appearance

Dull hazy appearance to prop spinner/wing surface

Dull look, loss of shine from deicing

Dull sheen on wing

Dull shine

Dull shine to fluid if Type II or IV. Type I holdover times
are to short to be used

Dull surface (**4 responses**)

Dull surface not shiny

Dull surface, no visible sign of deicing fluid left

Dull surface/accumulation

Dull surface/ice pellet buildup

Dulling of deice fluid

Dulling of finish, snow buildup

Dulling of fluid (**X 4 responses**)

Dulling of surface (**X 2 responses**)

Dulling of surface reflectivity (loss of gloss) caused by
gradual deterioration of the fluid to slush

Dulling of surface with ice accumulation

Dulling of surface, ice pellets collecting on surface, surface
freezing

Dulling of surface, snow or ice accumulation

Dulling of the gloss

Dulling of the treated area

Dulling or ice accumulation

Dulling, roughed surface, particles not melting on contact

Dulling, unable to absorb more rain

Dulling, whitening of surface

Dulling/inconsistent reflectivity

Dullness

Dullness of fluid on wings. Buildup of snow on wings

Dullness on wing, not shiny

Either by observing glazing or roughness o the wing

Elapsed time, intensity, visual wing appearance, amount of
runoff from wing. Buildup on wing

Evidence of fluid failure

Exceeded HOT or conditions worsen

Exceeding holdover time

Exercise ailerons/spoilers and look for ice cracks or pieces

Experience

Experience, common sense, buildup

Expiration of "HOT" (**X 3 responses**)

Expiration of time and does it look like it has iced up
(milky fluid)

Exterior inspection

Exterior inspection by qualified company employee

External inspection from qualified deice personnel

FAR's

FD & IP remain on surface for an extended period

Failure of snow to melt into the liquefied layer of fluid and
look for buildup of ice layer on surface, i.e. becomes
uneven

Failure on the precipitation to smooth out when it hits the
wing

Feeling the wing

Flaking ice

Flow

Fluid "looses glossy appearance"

Fluid appears diluted

Fluid appears to crystallize

Fluid becomes dull (**X 3 responses**)

Fluid begins to take on an opaque appearance

Fluid changes its color/texture

Fluid clouds

Fluid coating not smooth

Fluid dull - no longer shiny

Fluid flowing off surface and ice accumulation

Fluid gets cloudy, not glossy

Fluid has milky color

Fluid hazing or clouding

Fluid looking to be flat (vs glossy)

Fluid looks like slush

Fluid looses glossy look

Fluid looses its sheen

Fluid looses uniform surface tension showing variations &
discoloration

Fluid loses its shine

Fluid loses shine, no longer clear, appears opaque or
slushing, actual snow accumulation

Fluid losses its shininess

Fluid no longer clear

Fluid no longer visible

Fluid not adhering

Fluid not dripping

Fluid not glossy

Fluid not moving freely or pellets visible
 Fluid on observed surfaces becoming dull with a slushy look, but somewhat more difficult - rely on holdover times more
 Fluid on wing takes on dull appearance, no longer shiny & slippery
 Fluid on wing turns from shiny to dull grey
 Fluid reflectivity
 Fluid reflectivity becomes "dull" and may contain "crystal" like grains
 Fluid saturates, surface changes. Frosts up or pellets remain
 Fluid turns milky from shiny
 Fluid viscosity and change of texture
 Fluid washed away
 Fogging of fluid
 Foggy, glazy look, reflective, thin
 Formation of ice **(X 3 responses)**
 Formation of sheen on upper wing, or adhesion of IP to form "pimples"
 Forming of a clear film on the surface?
 Frankly - I use time, visual is difficult to determine
 Freezing drizzle & rain are much more difficult than snow or ice pellets since the former can give surfaces that shiny look that could be confused with a clean wing
 Freezing drizzle - need to observe surface directly. We don't operate if anything worse than light freezing drizzle
 Freezing drizzle appears glossy
 Freezing precip. beings adhering to sprayed surface
 Freezing rain - very difficult to impossible from inside the a/c
 Freezing rain is a no go. Judgment call on FZDZ vs FR Rain
 Freezing rain is tough. Look for shiny surface
 Freezing rain is very difficult to detect especially at night. If in doubt, have outside inspection done! Ice pellets sometimes change color
 Freezing rain is very difficult to identify whether it's sticking (fluid failure) or ice pellets seem to disappear out of the surface. Grain/pebbled surface on wing. Night within HOT, Type IV feel confident
 Freezing rain or pellets embedded within fluid
 Freezing rain starting to adhere to wings
 Frozen & uneven surface
 Frozen precip i.e. ice crystals or icicles forming on leading/trailing surfaces
 Generally will not depart per company. FOM in freezing drizzle
 Glaciers on wipers
 Glaze appear
 Glaze lost wing turn to a duller appearance
 Glaze on wing
 Glaze over
 Glazed appearance
 Glazed appearance & ice accumulation on surface
 Glazed surfaces or forming icicles
 Glazed wing or presence of granules on wing
 Glazing and loss of sheen on wing/control surfaces plus pellets do not melt on touching good fluid
 Glazing or frosty appearance
 Gloss
 Glossy (uneven looking)
 Glossy if ice (or opaque)
 Glossy appearance
 Glossy is good to ge
 Glossy looking surface
 Glossy wing surface or tactile inspection
 Glossy, icy appearance
 Go back and check the wings for buildup, at night we use flashlights
 Goes from shiny to dull
 Good question **(X 3 responses)**
 Grainy appearance of upper wing
 Grainy sandpaper appearance and a dulling of shiny surface
 Grainy surface
 Grainy texture on fluid surface
 Granular or sandpaper type buildup also water which hit wing ran a little then froze creating a raised line
 Granular texture starting to appear
 Granular, coarse appearance
 Granulated appearance - again - I don't see it often enough
 Graying of the upper wing surface
 Ground personnel accomplish an inspection, if any contaminants present we deice and depart prior to holdover time
 Ground personnel inspection
 Ground service i.e. ice man or maintenance
 Guess **(X 2 responses)**
 Guess & pray
 Guess & stay at the gate till I feel it's safe
 Guess/experience
 HOT & guess
 HOT & observing how much if any is sticking to aircraft
 Hand feel
 Hand inspection by iceman
 Hands on
 Hands on - very difficult to see from DC-9 windows
 Hands on inspection
 Hands on inspection from personnel outside a/c
 Hands on tactile check with Type I fluid (basically we don't go)
 Hands on touch
 Hands-on check by ground personnel
 Hands-on inspection
 Hands-on or wet look to the stripes on the wing root
 Hard to recognize with deicing fluid
 Hard to see - holdover times are very important with freezing drizzle
 Hard to see, but if melting on side window solution is working
 Hard to tell **(X 4 responses)**
 Hard to tell - dull shine & rough surface appearance
 Hard to tell - go more on judgment of conditions
 Hard to tell since they give a glossy appearance when mixing with fluid
 Hard to tell, loses reflectivity. That's hard to see
 Hard to tell-watch holdover times carefully &/or get hands on before T/O if any questions
 Hard to tell. Rely on holdover time (if extend, deice again)
 Hard to tell; various degrees of opaqueness on wing surfaces; time limits exceeded

Harder to recognize, but again looking for freezing rain/ice pellets starting to accumulate on surface & fluid not melting or causing freezing precip to melt & or puddle or roll off surface

Hasn't occurred

Have a mech. physically touch the wing surface

Have aircraft inspected prior to T/O

Have it checked if unsure. Much harder to tell

Have not experienced it in these conditions

Have not operated in these conditions

Have to tell, if unsure get deiced again

Have wing inspected by qualified ground personnel

Haven't been deiced in those conditions this year - but in the past the only way to tell really was a manual (tactile) inspection (on 727 using over-wing exit)

Haven't had opportunity

Haven't seen any recently

Hazing of fluid, ice buildup

Hazing over of dark strips on top of wing

Heavier reliance on holdover time. Visual inspection of surfaces with more frequency from flight deck

Help!

High gloss on surface

Hold over charts plus visual

Holdover time chart/tables **(X 15 responses)**

Holdover time - inspection **(X 3 responses)**

Holdover time and visual or tactile feel

Holdover time expiration **(X 2 responses)**

Holdover time expiration - followed by visual inspection from cabin windows

Holdover time/visual inspection use of ground crew

Holdover times in conjunction with dulling of surface sheen

Honestly I find it pretty hard to tell. I figure if I can see fluid dripping, then it is still effective

How much it has snowed and hold over time before t/o - final visual

Huh?

I believe it turns an opaque or whitish color

I call for a "hands on" inspection from the ground deicing crew

I can't

I do not depart with such conditions

I do not exceed holdover times in these conditions

I do not know again

I don't T/O in FRZ rain.. period

I don't fly in freezing rain or drizzle unless the takeoff can be made immediately after anti-icing

I don't go

I don't know

I don't know. We don't takeoff in anything worse than light freezing drizzle or freezing rain

I don't operate in freezing rain because our company will not do remote deice, I never depart, unless remote within the holdover

I don't; I return to the gate

I go strictly by holdover time but also use the fluidity of precipitation on my unheated cockpit window as a reference

I guess

I have never done this one

I have not experience freezing drizzle

I rely on the HOT tables, primarily, but it has not yet been an issue for me

I understand it's almost impossible to tell fluid failure in freezing drizzle

Ice accumulating [on wings] **(X 4 responses)**

Ice accumulation on windows, wings dull appearance to wing surfaces except for clear ice

Ice accumulation on windshield wiper after deicing

Ice adheres to surface

Ice adhering to aircraft

Ice adhering to windows & a/c surfaces

Ice adhering to wing & other surfaces

Ice around unheated portion of window, wipers

Ice begins to accumulate

Ice build up on top of wing

Ice builds up, frost/ice forms on top of wing

Ice buildup **(X 5 responses)**

Ice buildup during or after holdover time visually

Ice buildup on representative surfaces using hands-on or visual check

Ice detector strip turns cloudy

Ice formation **(X 6 responses)**

Ice formation &/or pellets do not melt

Ice formation/adhering

Ice forming on failed area

Ice forming on the wing **(X 3 responses)**

Ice forming severe pellets laying on the surface

Ice forming/ice pellets accumulating

Ice on surface of a/c - a rough surface or shiny (icy) surface. Best to get external inspection (hands-on)

Ice on wing **(X 6 responses)**

Ice on wing or nose

Ice or pellets not melting

Ice particles don't disappear and wing doesn't have a "wet" look

Ice pellets - when the surface takes on a grainy appearance.

Freezing drizzle/rain - unable to judge

Ice pellets appears on surface or dull surface

Ice pellets are visible in the fluid, freezing rain usually ask condition of a/c deiced 1st if is sticking if sticks on a/c wings

Ice pellets not melting - difficult to tell - opaque fluid, I guess

Ice pellets similar to snow, freezing drizzle/rain very tough-would also use other parts of a/c (i.e. nose, wipers)

Ice pellets visible in fluid

Ice pellets, look at wing, if visible or surface lost reflectivity. Freezing drizzle - difficult to see loss of reflectivity

Ice sheens form on wing. A glazing over may be noticed

Ice still present

Ice streams hang off of wing edge

Iceicles forming, loss of smooth appearance, crystallization on windows

Icing indicators become hazy or not sharp in their outline

Icing on wings/nose

If I see ice crystal formation or dulling of fluid surface

If close to holdover time I have to send FO to cabin to inspect wings

If exceed HOT we are going back, slush accumulating	Lack of a smooth/shiny surface
If have not left gate I feel the wing with my hand or look at wing from over-wing window	Lack of consistent surface meaning level of gloss and color
If holdover time were to expire 1) FOs observation 2) if at night, or if ground personnel available would return to deice pad	Lack of fluid on wing/surfaces; frozen precipitation beginning to adhere
If ice appears to accumulate	Lack of melting of ice pellets - have never operated in freezing drizzle
If ice start to buildup on wing or wiper blades	Lack of shine of fluid
If it looks shiny during freezing drizzle rather than "wet" look seen after deicing	Lack of shiny surface (X 4 responses)
If it's sticking/if hazy appearance	Lack of uniform color & texture
If past holdover, requires (by company) check by ground personnel and/or re-deicing difficult to tell from inside a/c	Lack of smooth, glossy surface
If surface of wing doesn't have a smooth appearance & change of consistency of fluid	Large dull patches appear on the wing
If taxiways are freezing up and/or other a/c look like their wings are glossy - my wings probably are icing up	Less light reflective and/or turns milky or white in appearance
If the fluid has dulled & is no longer glossy - it's failed	Less reflective
If the hold over time is expired a pre-takeoff contamination check is an unreliable method to determine the contamination status.	Liquidity
If the now is visible on the wing, i.e. the wing is not shiny, then fluid has failed	Look at representative surfaces, holdover time look at the wing, call for external inspection if in doubt
If the wing is obviously wet from deicing fluid or clear of ice/snow	Look at the wing before takeoff
If there is any roughness or anything other than smooth fluid except for freezing rain/drizzle. In this case if "icicles" are forming on windshield wiper "studs"	Look at top of wing (forward portion) near boot area. Black boot gives good contrast
If there is doubt I physically check the surface	Look at wing (X 5 responses)
If, during taxi for takeoff following deicing HOT is exceeded, I'll do an inspection. If any contamination is seen, we'd go back for more fluid, If clear, good to go	Look for "bumps"/rough surface on wing
Immediate T/O after deice or 1/2 holdover time. Use remote sites for deice	Look for "glisten" or "glossy" but surface looks like that in rain too
Impossible to determine	Look for accumulation on wing, spinner & windshield
In freezing drizzle we have delayed departure. In rain & ice pellets again the surface remained shiny & pellets didn't melt into deice fluid	Look for areas of slush
In freezing rain, we do a tactile (hands on) inspection	Look for disruption on wing
In good light - persistent retention of ice on wing surface	Look for drips & run off from wing area . Glossy appearance disappears. Snow collects on wing. Notice other a/c ahead of you
Inconsistency in fluid layer	Look for frozen precipitation
Insist on hands on inspection	Look for glossiness on nose or leading edge
Inspection by ground personnel after holdover time has been exceeded	Look for ice buildup or a change or lack of change when precipitation hits the fluid
Inspection of wing surfaces from cabin window	Look for ice pellets sticking and not melting in fluid
Interrupted sheen on a/c	Look for icicles but probably can't see light freezing drizzle on wing. Check aircraft nose/windshield wiper assemblies from cockpit
Irregular surface (X 2 responses)	Look for surface irregularities on wings
Is it adhering to the nose, melting or has fluid failed	Look for the absence of melting KE
Is it shiny? How does it feel	Look out pass. window over wings
It is difficult to determine whether the wing is wet or has frozen precip	Look to see if ice is diluting & if consistency is as above
It is very difficult and may require a hands on inspection	Looks cloudy or milky
It seems to wash away and clear ice shows up or it freezes as it drains off the wing due to cold fuel	Looks like it will slide off during takeoff
It sticks	Looks like slush
It's very hard to see.	Looks rough or glossy
Judgment call by looking at wings & deciding if ice is accumulating	Looses shine, buildup of precip
Just a guess. Take a look at the wings	Lose glossy shine, snow begins to stick to surface with opaque color or change in texture
Just look for appreciable accumulation	Loses its "shine" becomes "dull"
	Loses shine (X 3 responses)
	Loss glossy appearance, areas of solid accumulation
	Loss of "shinyness" to reflected light with additional lumpiness
	Loss of consistency of the fluid
	Loss of fluid sheen
	Loss of fluid shiny quality, roughing of the wing surface
	Loss of glazed appearance (Type II)
	Loss of gloss (X 3 responses)
	Loss of gloss & color of fluid

Loss of gloss (i.e. dulling of surface reflection).	Must have hands-on check
Accumulation of any snow/slush	Must rely on holdover times, may not get any visible indication
Loss of gloss (sheen) to fluid	My best guess would be the formation of ice on my wing
Loss of gloss - non-uniform appearance	My window
Loss of gloss - slushy and buildup is freezing on fluid	N/A (X 5 responses)
Loss of gloss or turning white	Nearing holdover time, need visual inspection
Loss of gloss, fluid change to milky color plus grainy look	Need to have inspection
Loss of gloss, separation of fluid	Never experienced during a/c ops
Loss of gloss, turns milky & inconsistency of appearance	Never had this occurrence
Loss of glossy appearance (X 4 responses)	Never more than holdover time
Loss of glossy appearance of Type II	Never trained
Loss of glossy sheen but look for rough texture too	Never trained to suspect fluid failure
Loss of glossy surface & reference to wing decals	No (X 2 responses)
Loss of luster	No adhered and fluid becomes dull
Loss of reflectivity (X 4 responses)	No clue-other than shiny wing surface will dull with saturation
Loss of sheen (X 2 responses)	No distinction between types of precipitation
Loss of sheen/by feel	No experience (X 2 responses)
Loss of shine (X 2 responses)	No exposure in the last 2 years
Loss of shine, surface becomes dull & rough but color will become faded	No glossy appearance
Loss of shine/gloss on upper surface	No go
Loss of shininess on wings	No idea (X 3 responses)
Loss of shiny appearance of fluid or a glaze appearance of wing	No idea - I just look for the shiny coating with the color of the day
Loss of shiny surface (X 3 responses)	No longer shiny (X 2 responses)
Loss of the visual character of the fluid/(glossiness of fluid gone)	No longer smooth surface, glossiness of fluid gone
Loss of wet appearance change in color as ice forms	No movement of ice pellets
Lots of ice	No one can, that I know
Lower wing flaps to 35 degree before takeoff to complete contamination check. This the only way to see the top side of the wing surface	No smooth shine, off-white, rough
Mainly by noticing dulling of fluid. HOT's have too many variables to be useful	No sure way. If holdover time expired don't T/O
Mate surface sheen instead of shiny	No takeoffs allowed in this type of freezing precip
Melting	No training given
Milky color	No written procedure presently exists
Milky/hazy color of fluid	Non smooth surface, non-shiny surface
Mirror appearance of wing	Non-smooth/non-glossy appearance
Mixed appearing. Ice begins to form on wing	None
Moderate or heavy & holdover times and type fluid. If able tactile inspection of wing for a "gut feeling" sense of saturation	None so far
Moisture not building on wing?	None, no "go" if hold over time expires
Monitor holdover time	Not able to
More difficult	Not absorbed into fluid
More difficult - but same and roughness to the reflection	Not applicable during FR or IP
More difficult - if outside the HOT, I request tactile check	Not assimilated by Type II/IV, recognizably no change in observation if Type I
More difficult especially when using heavier/opaque type fluids	Not certain
More difficult to ascertain. The fluid is not viscous/moving - dull appearance	Not glossy
More difficult to determine. Usually requires more hands-on on wing stick to determine by ground crew	Not had any specific training
More difficult, but generally same as above	Not really sure - we went by the HOT for Type IV
More difficult. Freezing rain hard to detect failure and fortunately haven't been in that situation. Ice pellets would show "mottled" appearance smaller to snow	Not reflective, dull, whitish
Mostly by holdover times	Not seeing a shiny film on wings
Much tougher when freezing on a/c in very clear coats	Not sticking
Must do visual on wing	Not sure (X 10 responses)
	Not very well
	Notice buildup of snow on top of deiced wing
	Observation (X 2 responses)
	Color of fluid, amount of fluid on wing
	Once hold over is exceeded mandatory return for another deice
	Only by exceeding HOT
	Only with HOT guidance
	Opaque buildup on upper wing surfaces and engine inlets

Opaque color
 Opaque color, not shiny with depth
 Opaque slushy look
 Opaqueness of surface
 Open cockpit window - directly check radome, surface near window. Any question go back re deice and get hands-on inspection
 Open window
 Open window & feel side of fuselage, holdover times
 Opening cockpit window and checking fuselage
 Our Type IV is a greenish color. I guess it would be less green
 Outside check
 Outside insp. with qualified person
 Outside surface inspection by ground crew
 Over fuel tanks ops are suspended
 Overwing in cabin/color or accumulation - VERY DIFFICULT
 Painted black stripe across wing surface becoming visually distorted
 Particles adhering
 Patches of apparent frozen water on top of wing and on deiced/anti-iced pax windows
 Patchy fluid; change in reflective characteristics
 Pellets are not dissolved by fluid on the wing
 Pellets do not appear slimy
 Pellets melting or blowing off, shiny surface
 Pellets remain on wing
 Pellets stick, rain washes fluid away???
 Perhaps loss of shiny-wet appearance-I would use tactile/hands-on check from ground personnel if any doubt
 Physical inspection
 Physically check surfaces
 Physically inspecting wing
 Pre-flight: by touch. Taxi: by visual inspection of illuminated wing upper surface
 Precip dissipates fluid stays clear
 Precip forming sheet type ice on surface
 Precip remains in frozen form
 Precip sticking, surface loses smoothness/shine. Note, freezing rain at night might be very difficult to detect fluid failure, so use low holdover time!
 Precip. adheres
 Precip. doesn't dissolve anymore (slush on leading edge)
 Precipitation accumulating. Loss of gloss or reflectivity of deicing/anti-icing fluid
 Precipitation accumulation on a surface
 Precipitation stick to aircraft
 Presence of smooth surface tension
 Presence or lack thereof of fluid
 Precip. adheres to aircraft: personal minimums apply here- if I'm not off the ground in 2 minutes after fluid app. we reapply it
 Progressive surface freezing
 Progressive surface freezing (also probable irregular gloss appearance, though snow scenario easier to interpret)
 Progressive surface freezing. Dulling of surface reflectivity
 Puddling
 Rain drops start to freeze on side windows, props, wings
 Random accumulation of precip. Fluid running off wings.
 Anti-ice fluid color changes
 Rapid melting and no accumulation of snow
 Rate of dilution of fluid
 Re-accumulation, cloudy appearance
 Re-inspection of the wing prior to takeoff
 Really cannot assess without physical touch
 Reduce holdover time
 Reflecting light
 Reflective appearance disappearing
 Reflectivity and accumulation
 Reflectivity of fluid
 Rely on HOT
 Rely on post deice inspection and do not T/O beyond holdover times
 Rep surface looks smooth
 Residue on wing
 Rivulets of water
 Rough appearance
 Rough appearance across the shining surface of the wing
 Rough appearance to wing and boot
 Rough or grain looking on wings
 Rough surface (**X 9 responses**)
 Rough surface check on area for icing check
 Rough surface or gloss of surface
 Rough surface texture
 Rough surface, ice buildup
 Rough texture, HOT
 Rough/non-reflective surface
 Roughness of surface, if roughness "loose" or appear to be adhering to surfaces
 Shine to the fluid on top of wing & thickening of fluid
 Same as above and observing flow of moisture from surfaces
 Same as above, looking for opaque ice forming on the surfaces although I feel this condition is more difficult to assess from the cabin at night
 Same as above. However, I am a co-pilot and not all Captains have the same viewpoint
 Same as snow? If in doubt we are correctly trained to go back for more deicing
 Same for ice pellets-freezing drizzle/rain, I check to assess "fluidity" of wing SFC
 Same as above (during snowfall)
 Same, plus on visual inspection - feel of a/c surface/fuselage
 Same. The "reason" (e.g. fluid failure) really doesn't matter. What matters is whether or not snow or ice is adhering; from the operational standpoint. Confident when I can "see" adhering snow or ice!
 Scientifically you cannot
 See buildup, "crusty" looking
 See glossiness change to dull shine on wing surface
 See ice
 See ice creating an obscured pattern of accumulation- doesn't look smooth
 Sheen, clarity, signs of buildup knowing clear ice might look like deicing fluid
 Sheen/texture - much more difficult
 Sheeting stops particulate, buildup begins
 Shine surface, if dull or any doubt, return to deice

Shine to surface	Subjective assessment against no known standard. Expired holdover time equals failure
Shiny [surface] (X 6 responses)	Surface accumulation
Shiny fluid changes to opaque	Surface appearance
Shiny surface lost (dull appearance)	Surface appears dull, & not shiny with A/I fluid
Shiny surface no longer visible	Surface appears dull, not as shiny as when deice/anti-ice fluid is fresh
Shiny surface turns dull looking	Surface begins to freeze glossy appearance
Shiny surface, sometimes slightly opaque & irregular surface	Surface distortion
Shiny vs dull	Surface does not appear wet/clean
Shiny wings, no fluid movement	Surface dulling and contamination visible on wing
Shiny, glossy, surface	Surface freezing loss of gloss
Side (unheated) windows and nose area observations	Surface freezing, dulling of surface due to freezing or slush forming
Side (unheated) window icing	Surface freezing, dulling of surface reflectivity
Side windows of cockpit, external probe	Surface glazing
Skidding of snow on wings	Surface is rough
Slick, frozen looking surface	Surface looks matted
Slick/shiny surface disappears	Surface loses shiny texture
Slush accumulation on top of wing	Surface losing gloss or turns white or opaque
Slush appearance on wing or other surfaces	Surface loss of waviness of fluid
Slushing	Surface non longer glossy, plus washed surfaces gritty looking
Slushy appearance	Surface not clean or shining
Slushy appearance of fluid/loss of "shine"	Surface of fluid dulls. Snow begins to accumulate on the surface of the fluid. ..I guess
Slushy/icy appearance - if in doubt, re-deice	Surface of wing displaying a dull finish, vs a gloss finish when fluid is fresh but the change over is harder to detect. Tactile inspection is preferred
Small "holes" in the shine of the fluid	Surface other than smooth & glossy
Small tuft or triangles attached to wing	Surface shiny (always - if in doubt - don't go)
Smooth glossy surface becomes textured	Surface starting to turn opaque
Smooth or coarse wing & striations of wing markings	Surface texture as compared to what a "clean" wing looks like
Snow accumulating on black leading edge of wing, if visible against the black background, or the appearance of a rough, rather than smooth surface	Surface treated no longer appears glossy including a more granular appearance
Snow accumulation on surface	Surface turns white
Snow accumulation on wing/or unprotected windshield	Surfaces become less reflective
Snow adheres to the surface	T/O in freezing rain prohibited - poor question
Snow adhering to wipers & windshield - then check wings to see if it is "sticking" except use decals on wings	Time it
Snow appearing on surface plus changes with reflectivity of surface	Tactile check/test [of wing] (X 7 responses)
Snow begins to cause the wing surface to lose the gloss look	Tactile (from opening sliding window) combined with visuals
Snow begins to stick and not dissolve & precip adheres to wing	Tactile inspection is the only sure method of detection. This must be accomplished within 5 min. of departure
Snow collecting	Tactile test on side window
Snow is adhering to wing to the point you can see it as it happens	Tactile/visual test
Snow on wing	Take a guess
Snowfall is adhering to wing	Texture
Snowflakes do not melt on contact with surface & lack of shiny surface	Texture of fluid
Solid accumulation on wings, no absorption with Type II	Textured surface, decal on wings become blurred
Solid clear ice on wing, or ice pellets sticking to wing	That's hard, would probably ask for close up tactile inspection (touching)
Some accumulation; also "dullness" to fluid - loses its "shine"	The dulling of the treated surface as contamination builds on the surface
Spots through the gel layer	The fluid looks clumpy
Standing accumulation after holdover time?	The glossy fluid should start to look opaque
Sticking to any part of a/c but especially wings and prop/spinner and spoilers if visible	The look of the fluid on the upper surface of the wing and if there is accumulation on the wing
Sticking to wings	The nature of the precip on the wing
Sticking, no "breakthrough" of fluid bubbles, no sliding off	The sheen is gone
Sticking/change in fluid	
Strictly holdover time (HOT)	
Subjective	

The surface becomes dull (**X 2 responses**)
 The wing no longer appears to be wet, glossy, smooth
 The wing surface begins to lose its glossy sheen
 The wings start to get white
 This condition is harder to assess, but generally the side window freezes? or at least becomes coated making outside viewing impossible. Wing inspection from cabin becomes necessary
 This is a gray area for me - Type IV fluid & airport field reports help
 This is generally a no go situation because of short holdover time
 This is more difficult because ZL & ZR are shiny. A hands on inspection may be provided if holdover time is exceeded.
 This is very subjective
 Time & visible ice formation
 Time & visual inspection
 Time and accumulation
 Time and good judgment
 Time from HOT
 Time, texture, color
 Times & surface exam.
 Top of wing is dull not shiny
 Touch surface if available
 Tough, because the freezing drizzle has a "sheen" itself.
 Judgment call on the uniformity of the sheen
 Try to see if any accumulation is visible
 Turns dull (**X 2 responses**)
 Turns dull in shininess
 Turns glossy
 Turns milky
 Type I fluid unreliable almost no holdover. Freezing rain will appear glossy with or without anti-icing fluid
 Type I fluid will lose its glossy sheen
 Type fluid/time chart
 Unable [to determine] (**X 8 responses**)
 Unable if holdover expired WILL get deiced again!!!
 Unable or difficult to assess
 Unable to reliably make inspections in drizzle/rain - if holdover exceeded - get deiced
 Unable to see fluid
 Unable to see surface clearly underneath fluid
 Unable to tell. If holdover exceeded - go back
 Unable, stick to holdover times
 Uncertain (**X 9 responses**)
 Unsure (**X 3 responses**)
 Unsure, if not visible
 Upper leading edge of wing deice boot and nose area forward of windshield. Fluid gets very dull and washed out
 Upper surface of wing loses sheen, stops looking "wet", liquid on wing becomes milky/opaque
 Upper wing appearance
 Use holdover time and visual inspection
 Use times from table and make an intelligent decision from present weather conditions
 Usually have external inspection by qualified inspector prior to T/O
 VERY difficult.. Look for "shiny" wing
 Very difficult

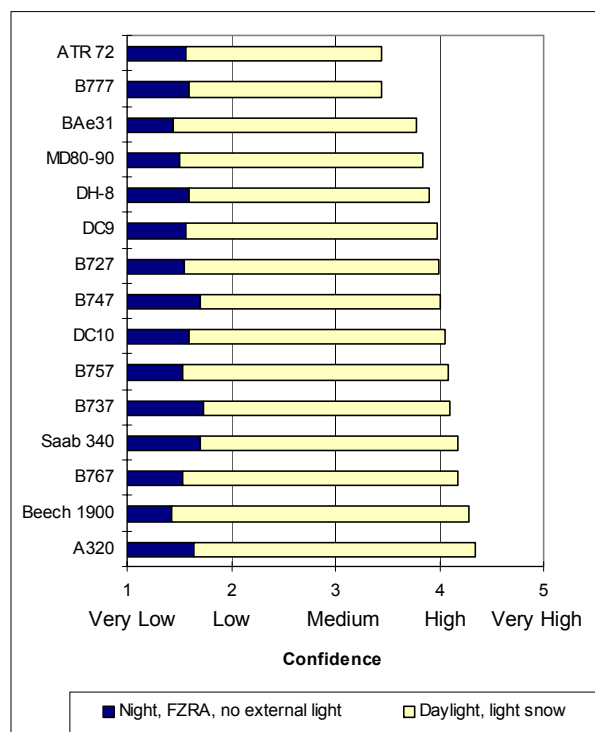
Very difficult but the same as above
 Very difficult to determine shiny ice glaze or shiny protectant-covered surface!
 Very difficult to see if holdover exceeded get hands on inspection
 Very difficult to tell, but I have had no instances of this sort. When I had them in the past, I did not exceed the holdover time & went ahead with takeoff. After looking for ice on cockpit window/wing
 Very difficult, go with holdover times
 Very difficult, observe rough surface
 Very difficult, rely on "HOT"
 Very difficult, you have to look at the whole situation, temps amount, how long then maybe just say "no" fly
 Very difficult. It all looks wet. Almost have to "feel" it for solids
 Very difficult. Wing is "wet, shiny" with deice fluid as well as freezing precip
 Very hard to do
 Very hard to do, but shiny smooth wing. I live by holdover time
 Very hard to see at night
 Very slick or shiny appearance
 View designated area for failure
 View through designated viewing position through window
 Viewed surface appears dull or shows snow accumulation
 Visibility of wing surface areas obscured & texture of fluid
 Visible accumulation on surface
 Visible accumulation, I guess
 Visible buildup on wings (**X 2 responses**)
 Visible buildup/surface reflectivity
 Visible clear ice and rim ice
 Visible frozen precipitation on wings
 Visible ice or a dulling of the wing
 Visible ice or pellets
 Visible icing and/or failure of surface to prevent accumulation and ice buildup
 Visible lumps on wings
 Visible pellets (again, difficult to determine)
 Visual check/inspection (**X 17 responses**)
 Visual - HOT
 Visual - reflectiveness of fluid Type II
 Visual and working with exterior physical checks
 Visual appearance of wing (accumulation of ice)
 Visual check if over holdover time
 Visual check of wing from the cabin
 Visual check prior to departure. Any buildup!
 Visual condition of wing surface
 Visual from cockpit/cabin
 Visual inspection after holdover time expires
 Visual inspection and judgment based on experience
 Visual inspection and/or hands-on check of the wing surface by deicing crews
 Visual inspection of accumulation
 Visual inspection of wing surface and tactile if necessary
 Visual inspection to determine if there is any buildup or adherence of moisture/slush/ice
 Visual look/time
 Visual observation & consulting holdover times
 Visual or touch if possible
 Visual wing check from cabin out window to black stripes

Visual wing inspection
 Visually (**X 3 responses**)
 Visually & holdover time
 Visually & with timed holdover charts
 Visually by F/E report
 Visually checking the wing from cabin
 Visually inspecting wing surface from cabin not sure what failure of fluid looks like
 Visually see if ice is forming
 Visually using the deice boots for a reference
 Visually, but will not go beyond HOT in these conditions
 Visually, look at left wing watch for a buildup of snow, wing becomes a dull color, reflective indicator on wing
 Visually/holdover/experience
 Volume of precip. Accumulation - judgment
 Windshield, wiper blades, leading edge of wing, raise spoilers, lower flaps
 Wing surface fluid losing its sheen, but tougher to tell for sure
 Wing, losing its glossy sheen, contaminants "stick" to wing
 Walk around
 Walk back & look out at the wing
 Washed off or appears to be due to saturation of precip
 Watch for loss of smooth surface
 Watch wiper blade hardware or send f/o back
 Water is easy to discern from ice, but ice pellets - I look for "lumps"
 We are not allowed to depart in freezing rain
 We are not permitted to T/O in freezing rain
 We are not permitted to make this assessment after expiration of holdover; must re-deice
 We are required by our GOM to perform a tactile test in freezing rain/drizzle
 We cannot operate in freezing rain cond. for the other two: same as a)
 We don't go in these conditions
 We look for side window icing in the ATR
 We've had no training
 When ice begins to form
 When ice/precipitation freezes to the wings
 When looking at the wing, we see a possible contour change starting at or AFT the leading edge. I have not experienced such a situation. I do not know if the above would happen or something different.
 When snow stays on top of fluid/wing i.e. any buildup
 When the deiced/anti-iced leading edges lose their shine and become dull
 When wing does not look completely "wet"
 When you see snow accumulating
 Whether fluid can be seen to move on wing surfaces.
 Almost impossible to see at night or if there is no wind
 Whether it sticks, clear vs cloudy (wetness)
 White hazy surface
 White surface, dull surface
 White/dull white surface
 Whiteness on black areas
 Wind does not move precip
 Windshield wipers begin to accumulate ice
 Windshield wipers, prop spinner

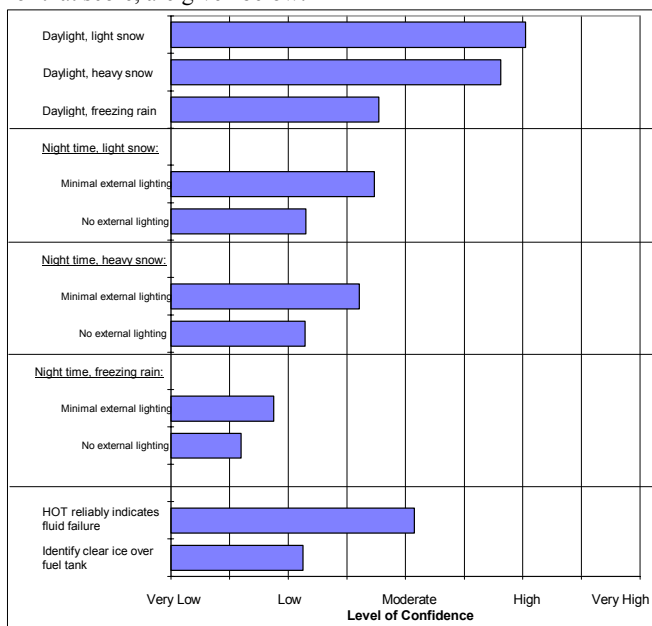
Wing appears icy
 Wing appears rough
 Wing become shiny
 Wing becomes smooth & shiny
 Wing doesn't appear clear
 Wing gets lumpy
 Wing goes from shiny to opaque
 Wing has dull vs shiny look
 Wing has either parachute chords or strips = check coloring of precip
 Wing inspection
 Wing is not shiny
 Wing looks clean
 Wing no longer looks smooth and shiny. Begins to look milky
 Wing surface appears dull (not glossy) except with freezing rain/drizzle you must get a tactile check
 Wing surface becomes rough and uneven
 Wing surface color
 Wing surface dull
 Wing surface give a shiny and rough look
 Wing surface is dull or slush/ice buildup is evident
 Wing surface no longer glossy/shiny, taking on a dull finish
 Wing surface tends to become "glossy"; small ridges/shapes show up in several places
 With difficulty
 With freezing rain a direct vs angled light on the surface can be used. Hardest to detect
 With great difficulty - formation of ice
 With the clock and the look of the representative surface
 With Type I the holdover time is so short we don't even bother operating in these conditions
 You can't (**X 3 responses**)
 You look for the shiny fluid to dull in appearance
 You've exceeded holdover time
 ZL - shiny glossy appearance - IP-sand paper look pellets maintaining shape & forming on wings upper & leading edges fluid not flowing down wing

C6. How confident are you that you can identify fluid failure accurately under the following:

Factor Affecting Assessment	Level of Confidence in Assessment				
	V. Low	Low	Medium	High	V. High
Daylight, light snow	5%	7%	14%	32%	44%
Daylight, heavy snow	6%	8%	19%	35%	33%
Daylight, freezing rain	14%	26%	33%	20%	6%
Night time, light snow:					
Minimal external lighting (eg. on apron)	16%	26%	33%	20%	6%
No external lighting (eg. end of runway)	33%	34%	20%	10%	3%
Night time, heavy snow:					
Minimal external lighting (eg. on apron)	18%	30%	29%	18%	5%
No external lighting (eg. end of runway)	34%	33%	20%	9%	3%
Night time, freezing rain:					
Minimal external lighting (eg. on apron)	42%	35%	18%	5%	1%
No external lighting (eg. end of runway)	59%	27%	11%	3%	1%
Other Factors					
You can visually identify clear ice over the fuel tanks on the wing from inside the aircraft	36%	29%	22%	9%	3%
HOT reliably indicates the earliest the fluid could fail	9%	17%	38%	29%	7%



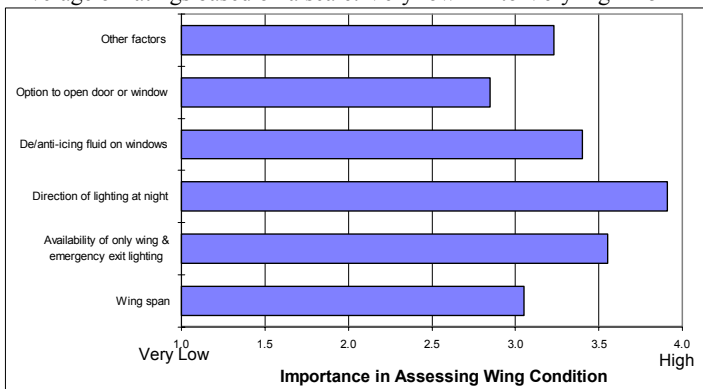
Average ratings of pilot's level of confidence, found by assigning each level a score from 1 to 5 and taking the average of that score, are given below:



C7. Importance of factors in affecting assessment of the condition of the wing

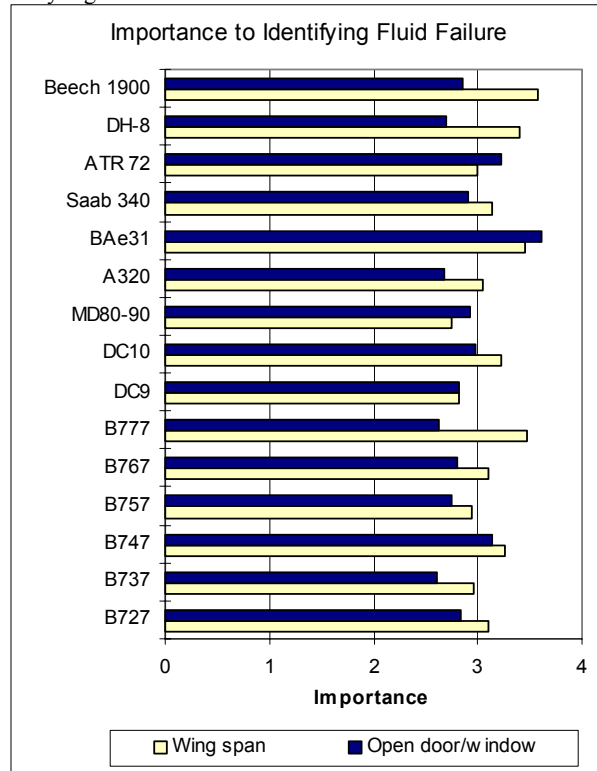
Factor Affecting Assessment	Importance in Affecting Assessment				
	V. Low	Low	Medium	High	V. High
Wing span	12%	20%	31%	25%	12%
Availability of only wing & emergency exit lighting	6%	12%	26%	34%	22%
Direction of lighting at night	3%	7%	19%	38%	33%
De/anti-icing fluid on windows	10%	18%	22%	25%	26%
Option to open door or window to get better view	25%	20%	17%	19%	18%
Other factors	14%	12%	35%	16%	23%

Average of ratings based on a scale: Very low = 1 to Very high = 5



Average of ratings based on a scale: Very low = 1 to

Very high = 5



Other factors:

Being a highwing a/c the availability to see the wing is not there. I feel there should be

Better examples are needed to recognize fluid failure. i.e. training

Color of fluids vary & in some types of lighting, are difficult to see at night especially

Disarms slide

Externally would be better

General lighting, etc. is OK to check both wings for ice nights or days

Hands on by ground crew

It is very difficult to assess conditions from inside the aircraft under any conditions

Make the airport or airlines provide a physical check of each aircraft prior to takeoff

Nice - but not an option

Not enough light on wings

Not really an option

Outside lights

Poor lighting

Poor question

Really need a ground coordinator to check and relay findings to be sure

We need to improve wing illumination dramatically!

Confidence of maint. assessment

Wing height

Wing lights could be brighter & wider-focused to cover full chord of wing

Flaps & spoilers

Inspector

Ability to lean over pax to see out cabin windows

Accurate METARS

Amount of other lighting

Amount or lack of ramp or end of runway lights

Cabin window viewing

Flash light (X 2 responses)

How close you can get to overwing windows (passenger load)

Interior lighting causing reflection on window at night.

Looking out pax window at top of wing

Passengers

Position in aircraft

Ramp lengths

Stretching over passengers

Viewing angle from windows

Window scratches & haze

Wing color

Alternative procedures for HIGH wing a/c

At night trained personnel to inspect wing just before takeoff

Automatic/manual monitor

Better ice viewing lighting on top of wing at night

Black ice strip on top of wing

Boots work great because of the black color

Color of wing

Crazed windows

Day/night lighting (X 5 responses)

Deicing team

Engine nacelle blocking view of large portion of wing from cabin

Exterior hands on inspection

External inspection by ground crew (if possible)

External lighting (non aircraft)

Fluid applied to nose

Getting over to the cabin window to see-very difficult with full load of people

Glare from lights at night

Ground check during walk ground

Ground support

Have some at end of runway

Haze on windows

High wing aircraft (X 4 responses)

I believe it is impossible to assess the condition of the wing-especially the condition of

I open service door and entry door

Ice lights

Ice/snow on windows

Light

Lighting (both external and cabin), fluid on windows distorting picture

Lighting is all important!

Limited visibility through windows

More lighting - sensors etc.

Need better lighting

Need hands on of electronic sensor

Need trained outside observer at runway

Night time

Passengers blocking view

Passengers in seats adjacent to viewing window & unable to view wings except from aisle!

Physically touch wing upper & lower surfaces

Remote deicing at runway
 Right wing-no ice observation light
 Scratches on windows
 Shade/color of wing
 Someone at end of runway
 Specific inspection lights (there are none)
 Tactile check
 Tactile inspection of wings & engines
 Temperature sensor on wing surface
Time (X 2 responses)
 Touch the wing
 Trained external observer
 Training
 Type of icing/conditions
 Type of wing
 UAL prohibits opening exist to evaluate wing
 Up close look at the wing e.g.: ladder belt loader
 Use of a powerful flashlight @ night
 Use of spotlight (**X 2 responses**)
 Wind directions & speed
 Wing illumination lighting
 Wing nacelle lights
 Would like detection system
 You can not see at night

Identification of fluid failure - Comments on factors or interactions between factors

Something else such as ice detectors
 The fluid & especially at night-regardless of the lighting.
 The only method that will give an accurate assessment of the wing is to be able to feel the wing bare hands. Since that is probably impractical, GOOD JUDGMENT BASED ON EXPERIENCE must prevail
 # of passengers in overwing seats can vastly effect how good a look you can get of the wings especially at night
 .Fuselage deiced window a real problem. Some crews wash a/c, other dust wings
 How about making fluids somewhat iridescent or reflective? Again, if we would always deice at end of runway, HOT would be negligible
 7b) c) & d) very important but currently not very good
 A camera looking at the leading edge of the wing would be nice
 A dark cabin would help if looking out the cabin window
 A darker/painted surface makes ice/fluids easier to see
 A high wing aircraft is always going to be difficult to observe
 A light located mid-point of the wing in the fuselage
 A wing covered with freezing rain/drizzle looks just like a wing that's been deiced
 ATR is a high wing aircraft - you can only see the leading edge of the wing - day or night
 Ability to determine fluid effectiveness extremely difficult at night with poor lighting. Clear ice (or black ice) is major concern on top of wing/fuel area

Ability to see wing well from "best viewing locations" varies widely depending on conditions (WC, rain, fluid on windows, lighting, etc.)
 Accumulation on ground & other a/c, OAT, open a/c door to get closer view of tail
 Accurate assessment of icing conditions/fluid failure from cockpit are almost impossible using what little wing area we can see. A cabin inspection is only slightly better, because visibility hampered by fluid/snow on windows, poor outside lighting
 After holdover times have expired, depending upon outside conditions (i.e.. rate of precip., lighting, etc.), the ability to CONFIDENTLY assess the wing condition varies significantly.. and who is checking the empinage/tail, horz stab.? Deice again
 Aircraft is full passengers it is hard to get good view out pax window
 Aircraft wing lighting fixtures are generally poor to fair help. Lighting from behind the wing is best (from ramp, street lights, etc.)(generally our ability to see the wing from inside the a/c is marginal at best
 All are important factors. There is no good way to assess effectiveness during night/heavy WX conditions inside the a/c
 All factors relate to one another. One has to see the surface in order to evaluate it
 All of the above factors are important but I am usually unable to affect any of them during a wing inspection from inside the aircraft
 All of these factors combined at night make it very difficult if not impossible to tell the first stages of fluid failure
 All the factors highly affect making the correct assessment
 All these factors are so variable that each situation is unique. I get paid to make decisions, just let me make them
 All these factors would not be important at all if hands on inspection were available just prior to takeoff
 Almost anytime at night there should be staff at runway to do outside visual and/or tactile of wing
 Ambient light & cleanliness of windows is most important
 An inspection via the ground deicing crew within 2-5 mins prior to T/O in moderate conditions (i.e. mod snow, any freezing rain condition) would probably boost my confidence of the appropriate training/responsibility was given to such personnel
 Any of the above situations would impede one's ability to assess whether anti-icing fluid was still intact, I have never had to inspect in the above conditions (i.e. night, snowfall, etc.)
 Any ramp lighting makes evaluation pretty easy. Wing lights only is much more difficult - I don't trust visual much at all at night away from ramp areas in external light
 Ask clearer questions
 Assessing condition of wing from inside of the aircraft is only possible (and still largely guess work) during daylight with good visibility
 At best our viewing positions are peer. I'm confident with good light at night for approx. 4-6 feet at the wing root. The tips are out of the question

- At night from anywhere on the a/c if external lighting is nil, i.e. departure end of runway, a conservative best guess is as sure as you can be
- At night it is ALMOST IMPOSSIBLE to determine the breakdown of fluid. In day light it is very difficult
- At night it is extremely difficult to judge
- At night it is extremely hard to see wings for assessing condition with cabin lights on and limited outside lights
- At night need better way to see all of the wing
- At night viewing wings from out passenger windows is not very effective esp. with cabin lights on and deicing fluid running across windows
- At night with deice fluid on window it is almost impossible to re-evaluate a wing from inside the aircraft
- At night, in poorly lit areas, it is very difficult to determine clear ice in freezing rain/drizzle
- At night, looking from a lighted cabin through a small window at an unlit top of a wing it is difficult at best to get a true picture of the condition of the wing. Using holdover time chart and observed weather conditions may be more accurate
- At night, with deice fluid on windows, and a bright cabin full of people - worst case scenario. I'm not sure I could really tell if the fluid has failed
- Availability of adequate lighting and fluid on windows are the most significant factors when Type II fluid is used it is essentially impossible to see through the window well enough to assess the wing
- B747 has overhead hatch and inspection light - however, due to size distance is greater to deiced area
- BAE J32 needs better wing deicing lights. We have to use a flashlight to get an accurate ice count
- Basically, it is extremely difficult to assess conditions from inside the cabin
- Best accessed by inspection team with boom-track DC-10 wing to high/large for pilot assessment
- Best deal is a hands-on inspection of wings and engines to determine need to or not to deice
- Best option for left wing and tail is to view from jetway. Right wing-only real viable option is to check from cabin windows, the jetway is really only viable during light icing/snow conditions
- Biggest problem in past two winters has been inaccurate automated weather reports. (i.e. freezing rain reported at -18C or light rain when a/c clearly have ice building while on the ground. Human needs to intervene: no blind reading - weather report over AT
- C7E) not option in most a/c I've flown and still view wings, etc. The best view is from outside the aircraft
- Cabin lighting - distortion through cabin windows
- Cabin windows at night are all but useless. A live human in a cherry-picker with serious spotlights is the only 100% way to inspect the a/c
- Can only see wing leading edge; at night the wing light only illuminates part of leading edge adequately; often can't focus on leading edge because of all the deice fluid on side windows
- Can't open wing exit door
- Can't see the wing at night with only the aircraft's lighting. Should have area near end of runway with good lighting. I am tempted to say we need a "qualified" ground observer, but I am not sure I would always trust someone else
- Can't tell if right wing has ice at night unless POWERFUL flashlight is handy
- Cannot accurately detect icing from inside a/c
- Cannot answer - aircraft flow has high wing
- Cannot open overwing exist on A320
- Checking the wings from a position in the cabin (my company's policy) is almost impossible at night. Away from the gate, near the end of the rwy; even with a good flashlight and the wing lights turned on, you simply CANNOT see the wing and the fluid very well
- Checking wing icing visually-especially at night is impossible on the MD-80. The only acceptable check is hands on-touching the wing surface and leading edge area
- Color of wing. Need black stripe (like TWA)
- Combinations of de/anti-icing fluids on cabin windows and low visibility/night conditions make it very difficult to assess conditions
- Comments to C7E) Done so more times than thru a small window-....
- Confusing wording of question above but anyway, it's very difficult if not near impossible to assess wings from cabin especially at night with interior lights on and passengers obstructing views
- Crazed, scratched windows, need to touch to check for sure!
- Day or night is biggest/most important factor in doing my own observation from the aircraft
- Daytime vs night time makes a big difference
- Definitely more difficult at night. Sometimes when fluid covered the primary inspection windows I had to use other windows
- Deicer need to be very careful in the forward section. They must clean the nose section with fluid yet keep the glass relatively clean. They must make a specific effort to ensure this is done properly
- Deicing fluid on windows is the greatest obstacle in checking the wings
- Deicing fluid on windows significantly impedes the ability to inspect wing, as does the amount of available light
- Deicing should be an airport responsibility. Put the deice equip. at the end of last chance area and be done with holdover times and last minute checks-which are ALWAYS RUSHED!
- Depends on what type of precip. Light snow is not a big concern on B727
- Detection devices would be very helpful
- Do not understand the question
- Don't know
- Don't understand this question. Why not re-design deicing systems so they can operate during ground ops and during T/O roll?
- Don't want to open a door or window! Eyes outside of the aircraft would help
- During daylight it is relatively easy to inspect wing surfaces. Contrasting colors can give good references. CAPS, walkways and wing markings. When cabin

- windows are covered with fluid and at night very difficult
- During good daylight conditions-ability to determine condition of wing is good, as light & visibility lessen so does the ability to accurately assess the condition of wing. Determine "fluid failure" in real conditions is best guess situation-outside of the
- During light-mod dry snow I trust the HOT's in heavy or wet snows. If within 5 min. of holdover time expiration - I have to go look at wings from within a/c. If he is unsure - I go look
- Each a/c should be able to absolutely determine extent of problem by window viewing or some other method
- Emergency exit lighting and wing inspection lights were not designed for this purpose and are of very little help. Only lighting from external sources (not on a/c) are helpful
- Evaluations and all the guess work by pilots could be eliminated if airlines were required to have deicing set done right before takeoff at the beginning of the runway (taxiway)
- Even when opening cockpit windows can only see outer 1/3 of wing leading edge. Unable to see further back onto wing surface
- Everyone knows it is virtually IMPOSSIBLE to determine ANYTHING looking out a window for best vantage point. We go thru this mindless drill because some FAA non-pilot says we must. FAA must change all airports to be better suited for deice/anti-ice ops clos...
- Example: 300/737 you can see the leading edge. of wing and some of the top. 757-767 no dice
- Exterior lighting (non-aircraft) shining on window with deice fluid on it makes very difficult to assess
- Exterior lighting i.e. ramp lights are very helpful in assessing the condition of the wing. It is also helpful to observe from several different vantage points
- External inspection by a qualified individual would solve this problem. It is by far the best way to assess conditions
- FO does inspection & then tells Captain
- Factors are cumulative
- First hand observation with ladder or cherry-picker on wing is best
- Flash light on wing to look at black inspection areas on wing
- Fluid adhering to pax windows will make it hard to see ice on wing. Ice lights on our wing help a lot
- Fluid covering the flight deck windows makes it harder to see the wings and engines
- Fluid on cabin windows can make it almost impossible to see the wing surface clearly. Opening cockpit window to look at wing - would be of little use (too far away)
- Fluid on the windows and adequate lighting are my biggest deterrents in assessing the fluid
- Fluid on windows and PWR lighting are main factors. I believe all inspections should be hands on outside the aircraft with a qualified inspector when holdover times are exceeded
- Fluid on windows can be a real problem. Experience level of fellow crew members can be a factor in properly assessing condition of wing
- Fluid on windows prevents accurate assessment
- Fluid on windows worse inhibited
- Fluid on windows you can't see a thing. Brighter wing lights could help
- Frequently check jetway railing - to see how precip is sticking to metal surface
- From the overwing exit windows at night (or even day) the pilot check of wings is a joke. You can't see anything except piled up snow. It's a total waste of my time
- Full airplane with people blocking windows, night ops, anti/deice fluid on windows, and checking in runup pad during light accumulation is very hard. Most major airports are doing good job of spray & go within 5-10 mins
- Glare and amount of lighting available are of paramount importance
- Glare at night makes it impossible to accurately assess the conditions
- Good cross-check of windshield wiper blade areas and wing root areas. Also wing light lens and flap areas on walk around
- Hard to always get a clear & accurate impression of wing surface at night and especially if windows are obscured in any way
- Hard to see at night the surfaces of the wing, due to poor views out of cabin windows
- Hard to see wing from cabin during night hours
- Have aircraft inspected from outside if I have even the slightest doubt, I go back to the gate. How do you check the horizontal stabilizer?
- Have all airports require remote deicing before takeoff not at the gate
- Have ground crew check with ladder
- Have not completed any training on the above areas
- Have someone from ground crew check wings before a/c taxis onto runway
- Having a big beam spotlight on the a/c - checking first surfaces deiced. Also wind WX direction has a factor involved on surface inspection
- Having a clear field of view of the wings with proper lighting is essential, especially at night
- Having access to wing surfaces to visualize closely or touch -(i.e.) on smaller a/c if HOT expires using any means available for inspection outside a/c
- Having windows clean in cabin area where you usually check wing is something that could be improved/emphasized with deicers
- High wing a/c are more difficult to inspect
- High wing a/c are very difficult to assess
- High wing aircraft magnifies the difficulty of identifying ice accretion-specific wing illumination lighting for the upper surface of the wing (not just the leading edge) would dramatically improve pilots' ability to visually verify fluid integrity
- How about a colored patch on top of wing, coated with a texture or material that would show the beginning of fluid failure
- How hard would it be to have specialized crews to use high intensity lights directed on the wings to determine contamination just prior to departure-the crews would

- be protected from the bright lights & could look themselves as well. Both could agree or
- I believe an exterior close-up inspection is absolutely a must
- I believe an outside visual check would be the best way to ensure a clean wing condition
- I believe assessing wing ice day or night from inside the a/c is a joke! Nobody wants to admit it.
- I believe the light on the surface is the most important factor-under some night conditions I don't believe a visual inspection is of any benefit
- I can't ever tell with certainty (100%) that the left wing is clean due to deice fluid beading up & streaming on cockpit side window. The same thing happens to the cabin windows if you look from there; plus, pax are in the way
- I cannot reliably assess the condition of the wing at night from our designated viewing area
- I do NOT work for TWA. BUT I do think the black markings on top of wings would possibly give some definition to viewing conditions on wing, as most wings are light grey/silver or bare metal. Bad colors for viewing.
- I do not believe at night you can safely evaluate the wing from inside my or most a/c. Must be an external inspection if any doubt
- I do not feel comfortable being responsible for differentiating between clear, smooth ice and a wet wing. Particularly at night
- I do not make the visual inspection
- I do not understand the above question
- I do not want to be opening doors on a large jet
- I don't think most of us REALLY are sure we know exactly what to look for under moderate conditions (esp. with poor light)
- I feel freezing rain is very difficult to detect (in causing fluid failure)
- I feel uneasy at times believing what I can see out the a/c window to be truly representative of the a/c's condition. It may "look" but is it? I'm not always confident
- I fly a high-wing turboprop; the "best" vantage point is the cockpit. If the side windows are covered with fluid, it is nearly impossible to adequately see the wing
- I fly an ATR 72/42. We can not adequately inspect the surface of the wing
- I have NO -0- confidence in my ability to determine wing condition on this a/c during icing - DAY OR NIGHT -
- I have never had a problem assessing condition of wing
- I have not found a good place inside the a/c from which to inspect the wing. At night, it's almost impossible
- I have not used any of these-the DC9 is extremely sensitive to any wing/fuselage icing. Each deicing has followed with a hands-on check and immediate departure
- I think a pilot CANNOT assess the condition of the a/c from WITHIN the a/c. This is a task best performed by qualified people outside the a/c who actually SEE & TOUCH the wings & horizontal stab of the a/c
- I think evaluation from inside vs tactile/exterior inspection is marginal at best
- I use a hand held mirror to get a better view of wing and engines from cockpit window
- I use on unheated window in the cockpit to assess the rate and viscosity of precipitation that has struck the window after deicing has been accomplished
- I use the area above the cabin door to determine the amount, etc. This area is excellent to determine run back ice; i.e.: freezing rain
- I'd like to see program where, when a flight gets their IFR clearance, they are given an "expect takeoff clearance" time. We know how long it takes to deice our a/c & could deice accordingly, reducing the amount of time from deice to beginning of takeoff
- I'm not sure if I am reading the question correctly-But improved lighting, being able to open window; sensors etc. would aid greatly in appropriate assessment. As it is now, viewing the wing from cabin window with full row of pax & limited lighting (wing
- If viewing from a cabin window with deicing fluid on it at night, it becomes difficult to assess the wing condition unless one has a good light. Wing and nacelle lights come from the wrong direction. Best would be a light at the wing root directed to war
- If we could deice at the end of the taxiway just before takeoff helps a lot! Also a car wash style or type would make this step quicker & works well in Europe!!
- If windows are free of ice DO NOT put fluid on them. It makes it much harder to see out
- If you can't see from inside, then go outside prior to push Impossible to see some ice from inside of a/c
- In a perfect world, there would be enough light at the end of the runway to see well (this would be too costly I'm sure, because artwork inside the terminal is more important)
- In heavy snow/ice pellets/freezing rain the view from inside the cabin to the upper surface and back of wings is critical
- In the last 2 years I've never had a situation where HOT was exceeded and I couldn't accurately determine the wing clean
- Inadequate lighting during night time is my greatest problem
- Inspecting wings at night after holdover time expires in poor lighting serves only to reduce passenger anxiety
- Inspection at night is not accurate, after holdover one needs re-inspection, or deice at the end of runway immediately prior to departure
- Inspection by someone outside of the airplane should be required (non-pilot specialist)
- It is a combination of factors which make assessing the condition of the wings after deicing
- It is always difficult to judge wing condition from inside the aircraft. At night it is sometimes nearly impossible
- It is difficult to see on a high wing aircraft
- It is difficult to see wing surface through pax window at night
- It is extremely difficult to detect clear ice regardless of conditions whenever you are inside an aircraft
- It is hard to see the wing well through a scratchy cabin window on a 737. Lighting or wing surface is poor-

- fair. I could open a service door. Cockpit window visibility is limited mostly due to crummy lighting & cutoff angle
- It is not possible to assess the conditions of the wings and control surfaces from the cabin on large airplanes, especially at night
- It is often impossible to see the wing adequately. We go back for "passenger assurance" more than scientific checking
- It is sometimes almost impossible to see wing thru pax windows due to de/anti-ice fluids obscuring vision out windows. Additionally very hard to get close enough to window to see out unless pax are asked to move out of their seats
- It is very difficult to adequately see the wings from inside the a/c. I go primarily with the holdover times
- It is very difficult to determine if clear ice is present at night-I've seen what I thought was just a wet wing when actually there was 1/4 inch of clear ice-even touching. It can fool you (cold wet medal fees like cold wet ice)
- It is virtually unrealistic to expect the crew to make an accurate determination of clean aircraft concept at night with little or no lighting of upper wing surface, particularly with deice fluid covering windows
- It isn't easy to tell what's going on without an open door view with good light. It takes a close inspection by someone outside the aircraft
- It is very difficult to adequately see the wing surface through any airplane passenger window. That's why we depend greatly on holdover times
- It is very difficult to assess the condition of the wing from inside an aircraft unless it is clean
- It is very difficult to see wing when my windows are covered by fluid. It is almost impossible to check wing at night unless I open my window and lean out or do a tactile check
- It really is a joke to try to determine if the wing is OK from inside the a/c with poor exterior lighting - fluid on windows, etc.
- It's hard to assess any icing on the wings at night because of reflections & poor lighting
- It's impossible to view top of wing on an high wing a/c from inside. I have to use other visual cues
- Just about impossible to see clear ice on MD-80 wing - esp. at night. Aircraft windows are visually opaque
- Keep deicing fluid off anti-iced cockpit windows!!
- Lack of daylight and reflections from inside the cabin on cabin windows make night inspections almost impossible
- Largest problem is the fact that the a/c has a high wing
- Leaning across 3 seats of concerned passengers and the amount of time it takes while #1 or #2 for takeoff is a problem. I'd do it only if in doubt
- Lighting & coverage of windows with ice/snow/fluid are biggest factors
- Lighting and fluid on windows seem to be the biggest factors in getting a good view
- Lighting is critical to wing observations. Also deicing fluid/foam on windows makes it extremely difficult to observe wing surfaces with confidence
- Lighting is important but glare & lights in your face are bade. It's better to have a clean window than an open window or door, the stuff usually get in your face and detracts from viewing
- Lighting is the single most important factor in accessing deicing success
- Lighting is usually biggest factor for me. Bright lights don't help if they are shining in eyes making silhouette of wing, especially if deice fluid is adhering to window. Properly placed bright lighting would be a tremendous help
- Lighting is very important
- Looking at wings is a joke
- Main factor is obstructions on viewing window
- Maintenance. personnel making physical check
- Minimal night lighting greatly affects accurate visual inspection - it reduces accuracy
- More available light on surface the better
- Most deice situations decided in this manner: 1)to deice or not 2)holdover time 3)rate of precip falling to reassess holdover time 4)looking out window. Looking at wing is the most inaccurate & useless part. You can determine very little looking from in side
- Most difficult thing is viewing wing at night from cabin. I will not attempt takeoff at night if holdover time is exceeded
- Most ice lights illuminate the leading edge. A light positioned to illuminate the top surface at a point visible from the best viewing location would be very helpful
- Most important factor is to reduce delays after deicing period!!!
- Moveable deice - pads (area) next to departure runway. Inspection done by hand by deicing crew
- Must have a qualified set of observers on the ground to clear the aircraft and the a/c must be deiced only once immediately prior to takeoff. There should never be a "holdover" question. It is the Air Traffic System and Government debacles that place
- My aircraft has ONE viewing location-a pax window above the wing (wing is not visible from cockpit).If the cabin is full I am NOT going to remove an emergency exit to set a clear view. If it is night, and the ambient light is poor, and HOT has expired -we re-deice
- My airline views wings only from inside cabin. I always inspect tail surfaces prior to pushback from rear entry doors. Also, rear doors give a much better view than window ahead of wing
- My confidence in assessing the condition of the wing after deicing is zero
- My engineer does this - how many accidents have the majors had due to icing & spend millions for over kill. Have a clear wing and go
- Need decals on some very prominent points easily visible from cabin overwing windows-maybe make one window special surfaced to allow easier viewing
- Need exterior inspection at runway
- Need ground crew assist - but remote (close to end of runway) deice facility boosts confidence & use of multiple trucks on widebody aircraft

- Need icing "inspection" lights at night at takeoff airport during icing conditions to "inspect" wing before T/O. But these lights are not considered a no go item in these conditions. Had 2 instances where I departed from a maintenance airport (at night)
- Need something more accurate than the human eyeball to detect the removal of winter contaminants from a/c surfaces
- Need to touch it - can't visually check the tail surfaces
- Never had the option of opening door/window nor heard of anyone who has
- Night time is impossible with the lighting found on the taxiway in the remote deicing pad
- Night with deicing fluid on windows makes for an almost impossible task. Even in the daytime fluid on windows makes it tough
- Night with fluid on windows is very difficult to assess
- No option to open window/door on 747. Other factors: need ice detection system
- None work. You NEED an outside observer
- Not at all in any situation from inside aircraft
- Not my job
- Not only is direction of light important but also brightness/strength of light
- Not sure what you're asking for
- Nothing beats an unobstructed daytime (or good lighting at night) view of the wing either from the outside or through an open door
- Obviously light & clear viewing window are critical to assessment
- Obviously night poor/indirect lighting in conditions of FZR or FZL are my greatest concerns. Remote deice with Type II/IV fluids & conservative interpretation of holdover time charts has made these situations somewhat less dire
- Obviously removing obscurations (scratched) windows, deicing fluid, etc.) improves chances of making an accurate assessment
- Obviously, most of the pre-takeoff contamination inspection relies heavily on representative surface being clearly visible. Any impediment to visually determining the adequacy of deicing to this surfaces detrimentally affect this inspection
- On A-320 opening window and looking back on wing gives best view of potential ice buildup
- On B737, I would open AFT doors to look at top surface of horizontal stabilizer to get a close up of that surface day or night and would direct F/O to do same if he/she went back
- On DC-9 @ night lighting on wing is minimal
- On large commercial a/c the only inspection point is through pax window, usually covered with fog/deicing fluid, onto a wing lit only on the very leading edge
- On the 10 if needed I can open an exit door and assess the wing in close proximity
- On the A320, I always opened the rear doors to view the tail. Looking through cabin windows was almost worthless.
- On the DC-9 an overwing exit is the best way to view the wing
- On the DC9 it difficult at night to view the wings because of the view from the overwing exits plus the lighting. I open the window in the cockpit as well as having the F/O check the wings
- Once the a/c has been deiced it is virtually impossible to view the wing from the cabin window, due to the deice fluid on the window
- One has to be naive if he/she thinks a visual inspection from restricted vantage points is a valid conclusion to GO/NO GO
- One must bring eye level of viewing to same level of wing and have option for a tactile check-on wide body a/c the crew has very little confirmation-we need ground support-opening a door (emergency. exit) is not the answer
- Open window and touch fuselage
- Opening a door is stupid! Getting out of the a/c for a ground check is even worse
- Opening a door or window has never been discussed here. An interesting idea
- Opening a door would be extremely unsafe in my opinion
- Opening door or window is not practical
- Opening doors in most a/c is not a good idea
- Opening emergency exit on DC-9 would be great except it is too noisy and time consuming. Setting up improved lighting at runway would be nice
- Opening window not an option. Opening door to go out would be possible but only with a ladder.
- Crazed/scratched windows at viewing locations must be written up and replaced
- Option of opening overwing exits is not available at my airline
- Option to actually view critical surfaces directly (i.e. a "last chance" inspection when #1) would be exceptionally useful
- Option to open door or window is not practical
- Other factors-whether Captain will allow me to get out of my seat in order to look/assess the wings. Many do not. Human factors is the most important thing.
- Our maint. personnel assess the wings (not tail) & decide if deicing is required. I have low confidence in their "objective" opinion i.e. laziness, inclined to err on not doing the deicing
- Our procedure has us check wings from cabin if we have exceeded the holdover time. The windows are covered with a deicing fluid film making it difficult, if not impossible, to assess the condition of the a/c
- Outside lighting i.e. fog light of other a/c, street lights, sometimes help & sometimes hinder
- Outside visual inspection most important
- Overwing lighting is questionable at best
- Passengers in the way. Crazed windows
- Passengers obstruct viewing port. Poor exterior aircraft lighting
- Pax in seats
- Personnel should be available at the hold short line (or close-by) to conduct a tactile check prior to departure
- Pilots need to have a ladder to properly assess condition of wing
- Poor lighting and contamination on windows at viewing location - biggest problems

- Poor lighting, fluid on windows (both make it very hard to see at night)
- Poorly worded questions. Are you asking do I want a long wing or a short wing? What emergency exit lights have to do with any of it?
- Possibility of having a trained person outside the a/c to check wings when it is difficult to see from cabin i.e. (a deicer truck able to elevate and shine light on wing from above)
- Put some deice trucks at the end of the runway and do it just before T/O when it is most effective!
- Question C7 is poorly constructed - I do not know what you are after
- Regardless of the above physical constraints. It is not possible to access the cleanliness of a wing looking out a window
- Scratches on window or simply "not perfectly clear" windows drastically affect our ability to see through them. There should be an enhanced ability to view through the overwing exit windows!! Plus good external lighting ability!!
- Scratches on windows
- See comment C4 must rely on ground crew "hands on" and holdover "grindlinks"
- Shit? What are you asking?
- Snow on windows makes viewing the wing difficult, but deicing the windows causes the same problem
- Someone has to go back to the cabin (usually the engineer) to look at the wings
- Strong flood light above overwing emergency exit would be helpful
- Surface of nose skin visible from cockpit
- Swept wing a/c are difficult to see entire wing from cockpit. During moderate or heavy accumulation I recommend always doing a cabin check of wing to determine deice fluids success
- Swept wing, poor lighting, bad window optics make this nearly impossible
- Temp, lighting, intensity of precip. are all factors in ability to determine contamination of surfaces. Any doubt in my mind requires an external inspection or another fluid application
- The No. 1 reason is the clarity of the window. A/C lighting itself is normally adequate
- The ability to open window is only way I can really utilize this procedure as the BAe3100 has very poor visibility, particularly out of scratched acrylic windows. Although we are allowed to operate in light freezing drizzle or rain, most of opt not to an
- The ability to see the wing surface is the most important factor when fluid failure is in question
- The best and most reliable method is for a trained observer to do a tactile inspection if pilot has any doubts
- The big improvement the last couple years is the urgency or interest in ground/ATC to get aircraft departing shortly after deicing
- The bottomline, it is impossible to assess icing at night. You got to go by holdover times
- The clearer the picture of the wing the better with the least amount of obstructions
- The condition of the wing ice observation light. Some lamps do not seem as bright as others. Also brightness or focus may be affected by deicing fluid
- The contaminated window (by precip or deice fluid) makes it virtually impossible to make a valid assessment
- The experience, I have found that, in strong wind conditions, you should inspect while facing into the wind. i.e. wind 360/40 heavy snow, RWY 36... if you are holding short 90 to runway, snow will obscure view at .. side. So better inspect @ runway or par...
- The general grey color of wings masks snow & ice formation-I can easily see any contamination on my red car when I approach it, even from a distance!
- The ground crew outside should clean the a/c-then a T/O should be made without delay-view from inside the a/c is poor and if you pull out of deice pad and are cleared for T/O. Why go back & look at wings?? They are clean!!! GO
- The leading edge of the wing or an area of the wing should be painted black or some color that makes it easier to tell if there is any ice or snow on the wing
- The only positive way is to get on a lift and physically check the wing by sight & feel
- The only way to effectively rule out any question of contamination is to deice the a/c just prior to T/O. This method will eliminate all question as to contamination, or fluid failure. Setup deice station at departure end of runway
- The only way to make an assessment of the wing condition is with a check from the cabin. Wing cannot be seen from cockpit of MD-80 or 767-757
- The option to open the door is important, since not only can you see the wing better, it also gives you an opportunity to put your hand on the fuselage for a tactile check
- The overwing lights on the 757 are very poor when I flew the 737 they were MUCH better
- The problem is at night during freezing rain/drizzle and wet snow. Need to have trained persons inspect wing just before takeoff unless deicing was finished with no lines waiting for takeoff. Should be deiced near runway then takeoff within a few min .
- The problem is this: if you are able to observe contamination of any kind from inside the a/c you easily assume there is more & you need to be deiced. Looking through a pax window & not "seeing" any contamination does not guarantee a "clean" surface.
- The upper surface of the wing can only be observed from the cabin door. A flashlight is the only available light
- The window size on my a/c does not afford a view of the wing root area
- The wing illumination light needs to be pointing in the correct direction sometimes they don't light the wing well
- There is no lighting on wings, you also can't open windows. Better lighting would help
- There is no option to open a door or window to examine wing. Cannot see top of wing from ground during preflight must look from cabin
- This is a stupid, ambiguous question - too many "IFS"

This is the weakest link in the deicing plan. There needs to be more information/direction on what to look for in comparing an OK vs contaminated wing condition

This question is not very clear! My answers mean that I strongly wish we had better lighting and better direction of lighting. The fluid on the windows almost ALWAYS precludes getting a good view of the wing

This question is too confusing to answer with confidence

Time and weather conditions

Time related factors/the process includes several obs

To be able to directly view the wing might be helpful (although loud and uncomfortable for the pax)

To be honest-it is often a guess based on experience when trying to determine conditions of the wing prior to takeoff at night in freezing precipitation conditions (unless good lighting is available)

To try to assess fluid visually is like playing Russian roulette. HOTs should be hard times when it is precipitating

Too many variables

Training should emphasize consideration of opening window/poor exist to asses wing

Trying to check the wing condition from the cabin at night through a tiny window with a pax occupying the adjacent seat(& cabin lighting on in any combination) is practically worthless-many crews (incl. myself) rarely do this

Trying to look through a cabin window at night during precipitation is nearly useless - a show for passengers

Trying to make a visual assessment from inside cabin, standing in aisle(!) (due to passengers seated in 3 seats adjacent to window) Looking through wet window at poorly illuminated wing & mins from T/O clearance. Most challenging re clean a/c

Twice, I have gone out a door to gain access to evaluate condition of wing surface when unable to tell if wing was wet or covered with "black" ice

Type of precipitation, clear ice is more difficult to recognize than other forms of precipitation

Ultimate safety, in my opinion, would be an external visual inspection by ground personnel just prior to taking runway, especially in clear icing or freezing rain

Under bad conditions, only good, reasonable, check is done OUTSIDE by trained NON-CREW inspector

Unless you have a very clear window and good lighting over a large wing surface it is very difficult to judge fluid failure by looking at a wing from inside

Very difficult at night to see wing from B757 aisle (with passengers occupying seats) especially with deicing fluids on window

Very difficult to get good idea of wings condition at night from cabin windows

Very difficult to visually check wing for clear ice

Very minimal visibility of any surface when observing from the cockpit windows are always obscured too much fluid is sprayed directly on the window when no ice or snow accumulated there due to anti-ice system

Viewing on the BA31 is generally excellent

Viewing the wing surface from the cabin is a waste of time because 1) the windows are always covered with fluid and 2) the upper surface isn't lit very well and 3) if

there are people in the seats next the best viewing location (always), it's hard to see

Viewing through cabin windows is only real option.

Lighting is essential whether it be a/c or ramp

Virtually impossible to detect at night from inside the aircraft

Visibility can obviously be affected by poor WX conditions. But I have never been unable to get a good look at the wing conditions prior to takeoff

Visibility is very important. Touching the airfoil is very good either a pilot or ground person. Near the departure end of runway

Visual assessment is not very reliable

Walking into the cabin alarms passengers & doesn't seem effective-having an a/c system to give an indication of fluid failure & presence of ice would be ideal

We are always required to do a pre-takeoff check if within the holdover time from inside the a/c. If beyond holdover time, F/O is required to open a/c door and inspect wings of a/c

We can see most of the leading edge, which is well lit but cannot readily see top surface of wing or any of tailplane

We can't open door, but a good idea-B737 >taxiing out within 5 min of takeoff. I believe the only safe way is to have an observer outside of a/c visually check wings within 5 min prior to T/O as long as HOT hasn't been exceeded; i.e. airport or company ...

We depend greatly on deicing team in assessing condition of the wing. Ideally would be deiced just before takeoff in a very well lighted area. We need to see the surface and many times @ night viewing is poor @ best

We need large windows-& no passengers by them-unhindered access

We open door to check wing, but with a high wing it is difficult to see - cannot touch

We rely almost entirely on holdover times

When any type of Heavy precipitation (Frozen) is occurring my ability to accurately assess the condition of wings is always pretty POOR

When deice fluid is on the windows either cockpit side windows or passenger windows, it is useless to look out from

Why can't part of the wing be black so we can see a contrast with snow and ice?

Windows are so old and crazed that sometimes even seeing a wing is difficult much less presence of precipitation or fluids on the wing itself

Windows are too scratched to evaluate, also need to disturb PAX seated-usually can't see from either cabin or cockpit due to deice fluid on windows

Windows usually deiced adequately and Type II/IV would not be applied to window

Wing length not a factor since cannot see representative section from cockpit unless open window and lean out or check from cabin. Then most important factor becomes direction of lighting

Wing lighting is critical. The a/c I fly now has good lighting. The response to questions C6 & 7 would

have been much different due to lack of adequate wing lighting

Wing lighting is of the most important. I also take a flashlight

Wing lighting on the B737 is worthless at night. It only illuminates the top of the wing. Takeoff at night is a guess only, because the top of the wing cannot be clearly seen

Wing lights are usually aimed at the leading edge. We need strong, bright lighting, shining on the TOP of the wing to adequately assess conditions

With a long wing, night, low light, fluid on the windows it's a joke to think we can really tell in continuing light snow or freezing rain conditions. If it ceases to snow, rain, etc. it's OK

With adequate light, wing CAN be seen

With cabin lights on, wing lighting is very hard to see

With poor lighting, there is no such thing as a "best" view location

Without proper lighting at night, it is impossible to accurately view wing surface. If hold over time has expired you just have to go back & start all over again

Would be nice to assess wing without climbing over passengers

Would be very helpful to have direct light on top of wing

Would like to see someone at departure end of runway qualified to make judgment on condition of wing before departure especially at night

Would think that icing would occur somewhat evenly across wing surface. Since our HOT's are calculated conservatively, I feel confident that as long as we are in limits, we're OK

You can't see much from the cabin windows-day or night-the windows will be covered with fluids-lighting will be bad. It's almost not worth the trip to the cabin-unless it is snowing

You can't see wing from cabin at night

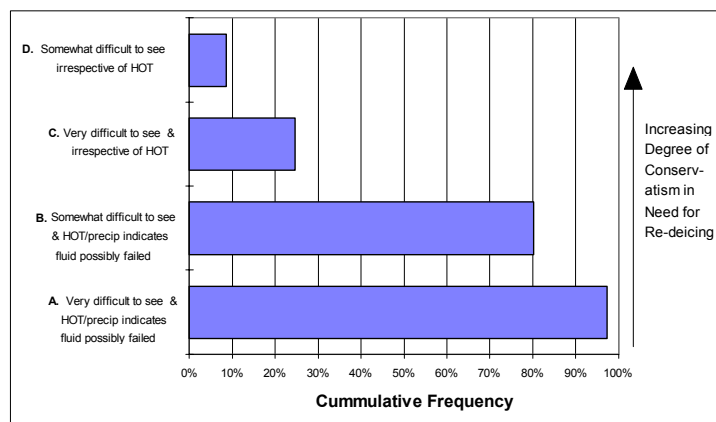
You cannot adequately assess the condition of the wing from inside the aircraft for ice buildup. Only snow buildup you can confidently see

You cannot see the DC-10 wing. You must depend on ground personnel

You must go into cabin & find window that you can see wing properly & at night shine a flashlight on surface

You simply can not be 100% sure at night it's that simple. Poor lighting, fluid on windows, etc.

C8. After deicing and during precipitation, just prior to takeoff you make your best judgment of the wing condition. Under which of the following conditions would you return to deice again:



[Invalid responses: 116 (7%)]

Comments:

Answer A: *Unable to identify any failed fluid, but the condition of fluid is very difficult to see and the HOT & precipitation rate indicates fluid possibly failed*

- A - Again, I think this heading back to a total lack of training in the identification of fluid failure
- A - Again-all inspections at night should be done by outside ground persons during precipitation
- A - At night condition "b" is rather common
- A - Basically the HOTO is my guide, with "adjusted" factors
- A - Communication check is also an option but in my experience is not used often enough
- A - Experience and type of aircraft are important consideration
- A - HOTO & "failed fluid" is B.S.! Again HOTO is
- A - Hard to say - value judgment based on conditions
- A - Holdover time and MY definition of "light" "moderate" "heavy" are the basis of my decision (inspect too)
- A - Holdover times so short as to be almost useless at large busy airport
- A - How many accidents are directly a result of snow on wings only
- A - I believe the question puts much too much emphasis on HOTO. HOTO is only one of many factors
- A - I generally trust the 1) quality of fluid 2) HOTO
- A - I have never been unable to see the fluid
- A - I trust holdover times. Feel they are conservative in most cases
- A - I will return for deice when any contamination on wing that will not blow off (dry snow)
- A - I would be influenced by how much time it would take (lots of taxi traffic) to re-deice only to end up in the same situation again
- A - If HOTO has expired and precip exists - I re-deice. I have been using the HOTO's as the decision factor if precip is occurring
- A - It is easy on this survey to say "yeah, sure, we will go back and re-deice". Try it with a plane full of angry pax on a flight that is already 4 hours late
- A - It's all just my best judgment. Every time varies

- A - Many variables to answer question (Type of precip) (OAT) (Surface wind) (Snow showers i.e. Flake effect vs steady snow i.e. blizzard)
- A - My experience has been if time < HOT then GO
- A - Open the door and look at what's really going on
- A - Possibly re-deice in situation a), instinct would play a part and that's hard to judge sitting in my kitchen
- A - Re-deice is no fun - end of runway touch up would be great
- A - There is probably no way a pilot can be perfectly legal and free of possible criticism
- A - This is all very subjective
- A - This situation is very difficult-there is so many variables involved that need to be carefully considered to render a final decision
- A - We return for deicing only rarely
- A - Would really depend on how well I could see a majority of the wing, when in doubt I would re-deice

Answer B: *Unable to identify any failed fluid, but the condition of fluid is somewhat difficult to see and the HOT & precipitation rate indicates fluid possibly failed*

- B - "C" maybe yes maybe no - when you observe the wing you have to make a judgment. If you cannot see the wing/fluid condition you re-deice or ask for ground support to inspect
- B - A wing inspection is not req. if the HOT has not expired, so I normally would not have the wings inspected within the HOT
- B - Ability to "see" is very limited & unrealistic
- B - Again, trusting HOT, as per conditions
- B - All above would depend on precip type/rate
- B - All subjective no REAL standard
- B - All these conditions don't discuss type/amount of precipitation, light snow/freezing rain???
- B - Any real question of contamination, requires re-deice
- B - As in all my other comments - must rely in temp time and rate & type of precip
- B - As long as you are within HOT, you don't need to check the wings from cabin
- B - As long as you're within the "HOT" & you have a clear aircraft, there should be no danger.
- B - At my airline if we are within the HOT a visual inspection of wing is not required
- B - Bad question - Depends on the environmental conditions-snow flurries/heavy snow, etc.
- B - Banking on accuracy of holdover time
- B - C&D almost always true
- B - C&D depend upon rate/type of precip + good JUDGMENT. If safety is at all in question, re-deice!
- B - C&D depends on other factors, i.e. precip rate
- B - C&D have ground personnel do "hands on" inspection
- B - C&D might require an external inspection
- B - C&D really depend on the rate and type of precipitation
- B - C&D would depend up what's observed outside cockpit windows on wiper blades, rain repellent tubes, windows, vadome, etc.
- B - C) D) if within HOT, would only look @ rep surface not fluid

- B - C+D would depend on precipitation rate
- B - C, D tough question/must use best judgment
- B - Car wash operations at or near runway
- B - Condition fluid not as important to me as condition of wing
- B - Currently no inspection required if HOT not expired
- B - Decision regarding C&D would depend on actual precipitation rate + OAT
- B - Deicing has been just prior to takeoff HOT has not been a factor last two years
- B - Deicing should be done as near the end of the runway as possible
- B - Depends on amount and type of precip
- B - Depends on precip. intensity and type, and temp
- B - Each case is different!!!
- B - Each situation is different., reference "C" - have to depend on outside conditions
- B - Go by HOT
- B - HOT & precipitation rate being the keys
- B - HOT & type of fluid used are most important to me
- B - HOT for my airline's operations are more conservative than Federal Standards
- B - HOT helps you make a decision when it's difficult to see
- B - HOT is HOT - we often don't even check
- B - HOT is all we have at night!!
- B - HOT is something I trust
- B - HOT is very important in my decision to re-deice
- B - HOT is virtually sole determinant. It is objective & measurable
- B - HOT numbers are generally very conservative
- B - HOT rules and watching other planes
- B - HOT times for new fluids are excellent but not to be exceeded without positive check
- B - Hard to generalize-each time the decision to re-deice is unique
- B - Holdover time not expired - OK to go. If doubts exist, holdover times should be adjusted
- B - Holdover time work very well. If conditions are that the fluid fails due to heavy snow, it fails very quickly
- B - Hopefully, the deicing crews are up to speed as to which fluid they're actually putting on
- B - I always check the wing visually if the HOT expires. First, then if well re-deice
- B - I am being honest - when you put it like this it's obvious we should deice again if it's difficult to tell
- B - I am confident in hot charts
- B - I am relying on HOT tables to be conservative values
- B - I am very comfortable with our holdover times, and trust it more than my own ability to judge in difficult circumstances
- B - I could just go outside and examine closely!
- B - I depend a lot on HOT
- B - I guess I rely on HOT in formulating a decision.
- B - I guess I trust the HOT time & my judgment on precip type and rate
- B - I have found our HOTs very accurate if not somewhat conservative
- B - I know of no runways which have lighting at the approach end which help me see the surface of my a/c.

- At night, I can say I am "never" certain of the fluid condition on my a/c
- B - I place a lot of faith in the HOT
- B - I place a lot of reliance on the HOT (along with other factors)
- B - I probably don't understand what failed fluid would look like
- B - I put faith experiences in 41 years of flying and HOTs
- B - I rely heavily on HOT
- B - I rely on HOT
- B - I tend to be conservative however I've been lucky and have not had these problems
- B - I tend to go by the HOT in the absence of contradicting evidence (perhaps I need to change my ideas..)
- B - I tend to rely on HOT more than anything else. If I'm within the HOT and I'm confident in the people who applied it, I'm probably going to be satisfied
- B - I think HOTs are the best tool we have
- B - I trust HOT's, unless I have good reason to think fluid has failed
- B - I trust the HOT as long as I'm being honest about type and severity of the precipitation
- B - I use conservative interp. of type/level of precip and pay close attention to HOT
- B - I use only HOT
- B - If HOT is not exceeded, we go without another visual check. If HOT is exceeded, and we can not be SURE of a clean wing - re-deice
- B - If I checked c. or d., I would never get off the ground
- B - If I ever exceed HOT I would get re-deiced
- B - If close to HOT & precip heavy - re-deice!
- B - If confident in what I can see, I'll go on. HOT not as important as visual if can see
- B - If doubt exists I would check wings from cabin
- B - If not positive - re-deice
- B - If the takeoff is well within the HOT and precip is not heavy I will takeoff. I depend at this point on our initial inspection and the deicing teams comments
- B - If there is doubt, deicing is the safest way to go
- B - If unable to see any fluid failure, but within the HOT most will assume it's OK
- B - If we get even CLOSE to HOT expiring, we will re-deice
- B - If we re-deiced every time the condition of the fluid was somewhat difficult to see - we would very seldom get anywhere
- B - If within HOT, unless I can tell fluid has failed. I go ahead with the takeoff
- B - If you think it might possibly be contaminated, re-deice
- B - In poor weather conditions, I do not believe fluid condition can be accurately assessed
- B - It's always a judgment call and sometimes you just get a feeling that things aren't right
- B - Judgment - what is the precip & rate of fall
- B - Judgment of external factors
- B - Looking at buildup on other aircraft is very helpful
- B - Many other factors
- B - May not re-deice but would want external inspection
- B - May re-deice under C. above with mod or greater precip
- B - Most important factor is to reduce delays after deicing period!!!
- B - Most pilot rely on HOT as primary method of determining the need to re-deice
- B - Must "trust" the supplier and manufacturer
- B - My crutch is the HOT - if I've exceeded it I'll deice unless I can confirm that the wings look good
- B - My experience is to use HOT to determine need to re-deice
- B - Night re-inspection & deice pads at runway departure end
- B - No pre-takeoff check required if HOT not exceeded
- B - Obvious judgment call re temps, type or precip
- B - On-line you depend heavily on HOT and precip. rate/type
- B - Other factors are to be considered for last two!
- B - Our HOT tables are specific as to: temperature, intensity of precip, type of precip
- B - Our company procedure: If HOT not exceeded, I do not have to visually check wings
- B - Our procedure is to inspect the wing from the cockpit if the HOT is not exceeded BUT you can't see the wing from the cockpit on the DC-10
- B - Our procedures are to check the leading edge of the left wing for contamination our first area of deicing by ground personnel
- B - Pilots seem to really trust the holdover time
- B - Poorly stated situations in C8 c) and d)
- B - Possibly
- B - Precip rate and accumulation on surfaces high priority
- B - Precip rate major factor
- B - Precip type and rate factor into decision for C&D especially
- B - Putting my faith on the holdover tables - I hope they're accurate & conservative
- B - Rate/type of precip very important
- B - Rely heavily on published holdover times plus area around windshield
- B - Remote deicing at end of runways solves most of the guesswork
- B - Rwy condition? Rotate at V2 to pre-empt pitch up/roll off - Slow rotation not an option with clutter or icy.....
- B - Situation A - I have returned for re-deice
- B - Some of these ?'s are B.S., leading a lamb to slaughter!
- B - Somewhat of a C.R.M./C.L.R. issue. The first officer looks and applies his standards, but it's the Captain's decision. Obvious choices are easy, gray areas/marginal are more difficult
- B - Spray the a/c when #1 or #2 for takeoff!
- B - Tend to be conservative-if HOT expired and I can't get a definite confirmation of clear wing I'll go back deice
- B - The best and most reliable method is for a trained observer to do a tactile inspection if pilot has any doubts
- B - The condition of the fluid is ALWAYS IMPOSSIBLE to see. The HOT is the ONLY reasonably reliable method to assess fluid condition
- B - The decision not to re-deice in the last two also includes my observations on the quality of the deice crew work and total volume of fluid used

- B - The schedulere-deice - we'll be late - eliminate this - who cares about the schedule? Safety = 1st priority
- B - These questions are very abstract - What can I see.....Be specific
- B - These questions would be unnecessary if deicing was at the runway
- B - Too much faith in HOT?
- B - Tough parameters to make a "decision" on paper. IOW "you have to be there"
- B - Type of precipitation would greatly influence this decision
- B - Unless conditions change, HOT is the best guide
- B - Unsure how to visually detect FAILED FLUID
- B - Use HOT almost exclusively!
- B - Use a long runway and pad takeoff speeds slow rotation rate be ready for a pitch change
- B - Usually can't see much at all during night ops-so I look but we usually go if HOT not exceeded even if I'm unable to determine failed fluid
- B - Usually depend on HOT of the fluid in all but heavy snowfall
- B - Very & somewhat are subjective. If I can't get a good look and we're near HOT based on observed precip, then we'll re-deice
- B - Very conservative in accepting holdover time - heavy gross wt T/O's 870,000
- B - Very dependent on HOT's as published - we trust them almost without questions
- B - Visibility of wings is always the biggest hang-up after deicing-we MUST be able to rely on HOT charts & assess temp & precip rates as they change
- B - Visual inspection wing occurs (at airline xxx) only after HOT expires
- B - We are not required to inspect the wing if HOT is not expired, but always check conditions from the cockpit
- B - We are told to trust HOT and inspection is not necessary if within HOT
- B - We consider HOT only guide. Place much more importance on visual conditions - i.e. precip rate and type and visual insp.
- B - We have to trust the HOT guidelines or we'd never turn a wheel
- B - We really have no idea what is happening on that wing and are relying on the holdover time-chart-temp-conditions
- B - We would never this degree of uncertainty in any other phase of operations
- B - We're trusting to HOT times without much inspection
- B - When in doubt have someone look from ground
- B - Who cares about the fluid? "It's the snow & ice"
- B - Without solid, reliable visual cues, I would have to rely on HOT
- B - Would judge by snow accumulation on nose of a/c also
- B - You can't assess every situation possible
- B - You have to trust holdover times!

Answer C: *Unable to identify any failed fluid and you can takeoff well within the HOT of the fluid, but the condition of fluid is very difficult to see*

- C - (d) would depend upon precipitation type/rate

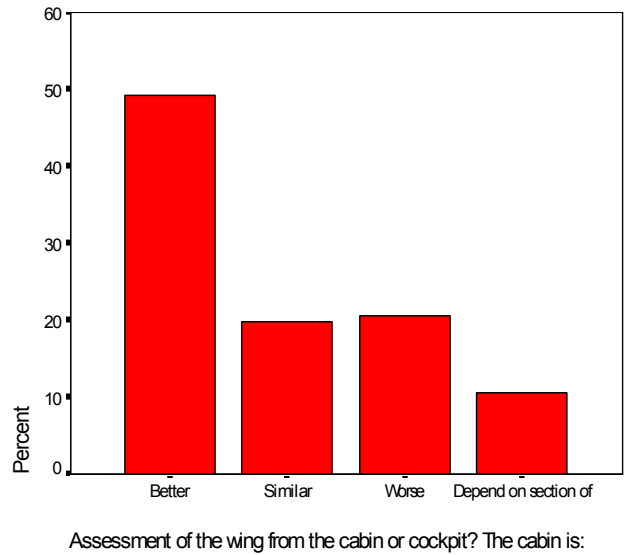
- C - Aircraft load is a factor. i.e. 10K under gross would have some influence on my decision
- C - Answer C. would depend on precipitation rates etc.
- C - C&D are within the purview of the pre-takeoff check vs the pre-takeoff contamination check
- C - Company policy is to re-deice if precip is occurring & wing cleanliness cannot be verified visually
- C - Depends if there is some freezing drizzle
- C - HOT are sure to get more & more accurate and reliable, especially Type II & IV
- C - I am unable to see the wing regardless of HOT I would re-deice if precip was heavy
- C - If HOT is OK and I can assess the wings being clean I would opt to go
- C - If any serious concern - we deice again
- C - If fluid is visible, I rely more heavily on HOT
- C - If in any doubt we go back
- C - If in doubt, deice again!
- C - If we're not sure, we don't go
- C - If your not sure - re-deice
- C - In all these conditions I would at least have the a/c re-inspected by our ground personnel
- C - Lousy questions!! Definitions please
- C - Must be able to get a good look at the wing to make a satisfactory determination regardless of what the holdover table says. The table is just a guide
- C - Must be able to visually verify condition of fluid
- C - Not sure whether it would be necessary to get re-deiced or just an inspection
- C - Observation of wing surface is a major problem - many times puts pilot in a very "grey" position
- C - Rate and type of precip and temp also influence the above decisions
- C - Ref. "C" If I can't visually inspect wing - can't go (FAA Reg. & common sense)
- C - The FAA's position and reg. says "You must visually inspect"
- C - The failed fluid concept is not discussed in our co. pilots are somehow expected to exercise good judgment
- C - This all depends on precip. rate. If it's not falling I won't re-deice
- C - Under these conditions, FO would go outside & do tactile test of wing
- C - When in doubt go get re-deiced
- C - When in doubt re-deice
- C - c) judgment call - if snow/ice is building on nose and skin outside my window, I would probably re-deice
- C - d) condition of the fluid is always somewhat difficult to see! These are judgment calls

Answer D: *Unable to identify any failed fluid and you can takeoff well within the HOT of the fluid, but the condition of fluid is somewhat difficult to see*

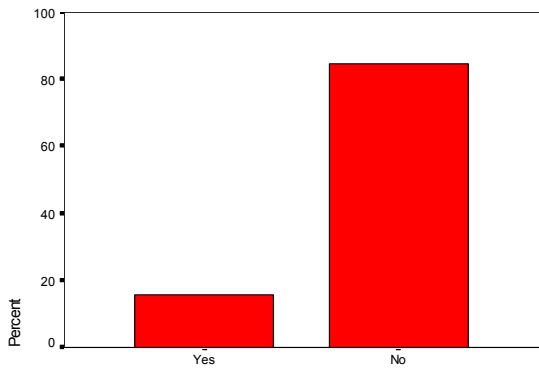
- D - #4-request visual inspection from outside a/c
- D - Absolutely must know if surfaces are free of winter caused contaminates i.e. ice, snow, frost
- D - Any doubt whatsoever, I'm going back
- D - Any risk - go back - the pilot must be absolutely sure
- D - Anytime a question - return!

- D - Company procedure is to re-deice if "doubt exists". If this was strictly applied, there would be a lot more taxi-backs for deicing at night
- D - HOT are in a "perfect world". Experience shows that they are too optimistic (Type IV)
- D - Holdover times are primary (even though they state the legal stuff about looking at wing) we don't get enough training on fluid failure-so I'm conservative-get deiced often
- D - I want to see visually the condition of the wing
- D - I will re-deice if any doubt exists
- D - I won't take off if I can't verify that it's safe
- D - If I CANNOT visually confirm that there is no icing I don't go
- D - If I cannot be sure the wing is clean, I re-deice
- D - If I'm in doubt, I don't go
- D - If any doubt or question re-deice!
- D - If it cannot be determined that the accident is clear, a takeoff shall not be attempted. Obtain inspection from qualified ground personnel or re-deice.
- D - If no precipitation adheres to the wing I'll take off (C&D)
- D - If there is any doubt, re-deice
- D - If there is any question well go back for more deice
- D - If there was ANY doubt as to the condition of the wing or surfaces I wouldn't hesitate to get re-deiced
- D - If you're not sure - don't go
- D - Our rules state that the wing must be clean, if in doubt, re-deice
- D - Re-deice at holdshort pt with portable system
- D - Ref. C&D: the type and rate (light, mod, heavy) of precip affect the decision
- D - Safety
- D - Should be deiced at runway and launched immediately by ATC. END OF STORY! It's so simple. What can't the Fed's get it
- D - What other safe option is there?
- D - When in doubt - re-deice
- D - When in doubt return-customer did not purchase chances they bought tickets for safe passage
- D - Why take ANY chances
- D - Wing condition can only be assessed 100% by being out on/near wing for tactile/visual insp.
- D - Wing sensors!
- Inv. resp. - A visual check for clean wing is the duly reliable indicator
- Inv. resp. - Again, it depends on what kind of precip.
- Inv. resp. - All depends on the type of precip. If it were freezing rain I might check box A.
- Inv. resp. - FAR's require that I visually am able to determine the condition. Your terms "very difficult & somewhat difficult" don't mean much. I can see or not see is the only thing that counts
- Inv. resp. - Fluid failure is not an issue - it's wing contamination
- Inv. resp. - Gross accumulation, not condition would cause return
- Inv. resp. - HOT is a joke. We could never fly if we use it religiously
- Inv. resp. - Holdover time
- Inv. resp. - I don't know what HOT is and have never been shown what deice failed fluid looks like
- Inv. resp. - I don't understand "HOT":
- Inv. resp. - I re-deice if I see ice
- Inv. resp. - I re-deice when there is ice or snow buildup on the wing
- Inv. resp. - I would need to see precip. buildup on wing, regardless of HOT, before I'd return to gate. Otherwise, you'd be faced with same situation again & again as you approached end of runway
- Inv. resp. - I'd return/or request hands-on tactile maybe or not re-deice. Takeoff if Type IV used. Type I fluid I'd likely return on each condition above
- Inv. resp. - I'm not sure what you mean by the condition of fluid. I look to see if there are any contamination on the wing. I don't normally notice the fluid
- Inv. resp. - If I can see any contamination on wing, then it's time to re-deice
- Inv. resp. - If I can't see from the cockpit or cabin, I get out and feel!
- Inv. resp. - If I see precip on surfaces I would re-deice or if HOT expired and T/O not expected before precip could accrue
- Inv. resp. - If precipitation is heavy a) & b) probably re-deice - if light - re-deice. C & D probably would not re-deice - heavy or light
- Inv. resp. - If the wing appears clean I go - while factoring in other factors - runway condition/length/WT, etc.
- Inv. resp. - If wing surface is contaminated then we re-deice
- Inv. resp. - Inspect
- Inv. resp. - My training is from Captains (as FO), in 3 years - I have never re-deiced
- Inv. resp. - Never experienced failed fluid
- Inv. resp. - Never trained for fluid failure
- Inv. resp. - No snow or ice on wing, go, if there is, deice
- Inv. resp. - None of the above
- Inv. resp. - None
- Inv. resp. - Not at all in any situation from inside aircraft
- Inv. resp. - Not enough info.
- Inv. resp. - Only on accumulation. No familiar with fluid failure
- Inv. resp. - Re-deice only for visible accumulation
- Inv. resp. - The reference to "HOT" is not familiar to me
- Inv. resp. - Time and precipitation, holdover time in that order usually. Deice fluid is sprayed on nose of a/c enabling fluid breakdown detection
- Inv. resp. - Unless the precip was MOD-heavy and temps were close to 0, I would usually do - obviously a judgment call
- Inv. resp. - Useless - my airplane cannot be deiced within HOT
- Inv. resp. - We use our judgment and play it safe
- Inv. resp. - We'd have to cancel all flights when it snows if we re-deiced for all of the above
- Inv. resp. - What are you looking for here?
- Inv. resp. - When using Type II or IV fluid, you don't have to deice if your holdover time has not expired and the precip & temp. condition haven't changed

Inv. resp. - You can NEVER see the cond. of fluid well enough. You simply deice and trust the deicer & judgment



C9. On the aircraft you fly, is it possible to check the condition of the critical surfaces from the cockpit?



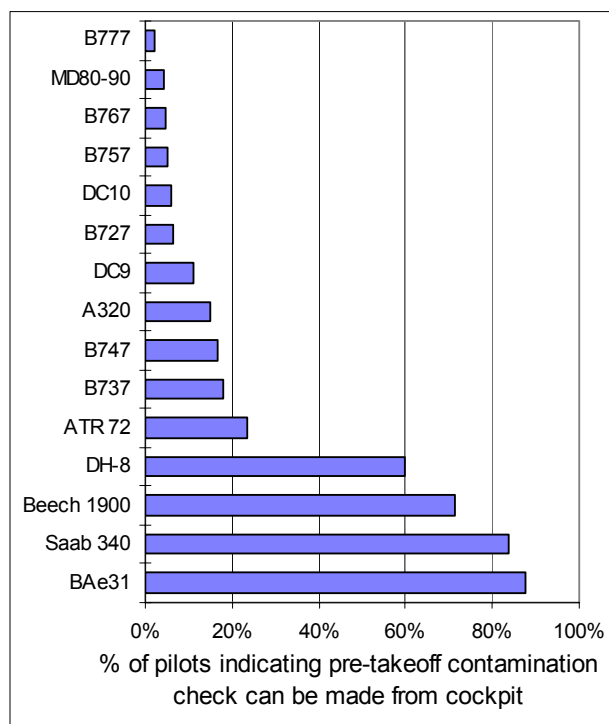
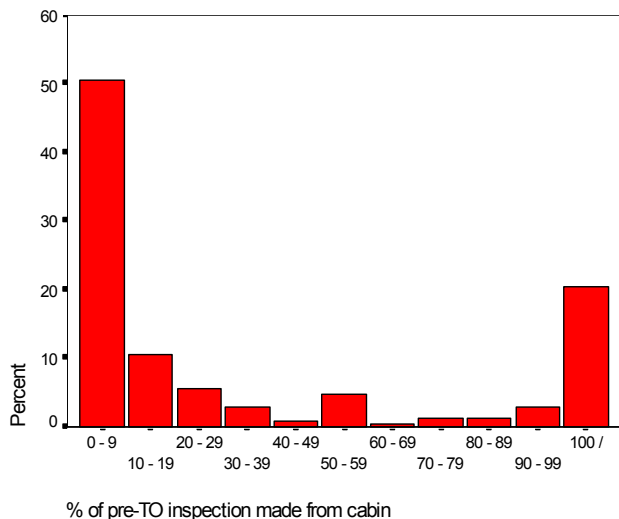
On your A/C can you conduct the pre-TO inspection from the cockpit?

[Invalid responses: 19 (1%)]

If Yes, from your experience, can you make a better assessment of the wing condition from the cabin or cockpit? The cabin is:

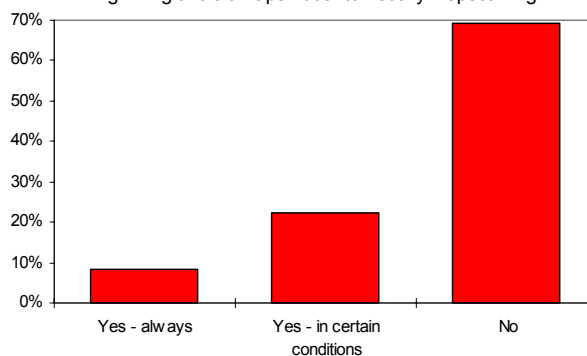
Please give the % of time you make the check from the cabin

Only 17% of pilots can make pre-take-off checks from both the cockpit and cabin. Of those 17%, the % of time they make the check from the cabin is:



C10. If you fly a high wing aircraft, when checking the condition of the critical surfaces just prior to take-off (near runway apron), do you open the door and visually inspect the upper wing surface?

High wing aircraft - Open door to visually inspect wing

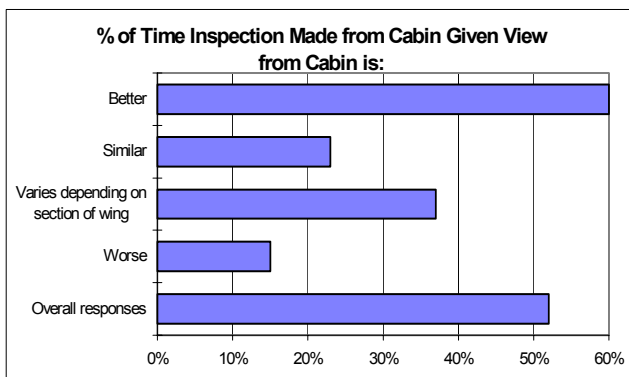


Other responses:

Don't fly high wing aircraft 1140 (72%)
 Invalid responses: 340 (22%)

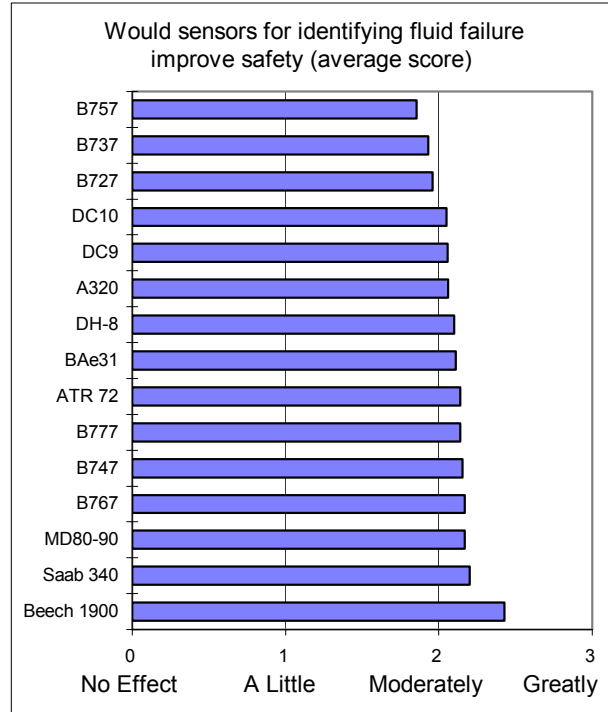
Conditions under which they would open door and visually inspect upper surface of wing:

I don't fly high wing aircraft - When I DID, we'd open the a/c passenger door & view the wing top
 Yes -in certain condition - After HOT expires
 Yes -in certain condition - After HOT has expired

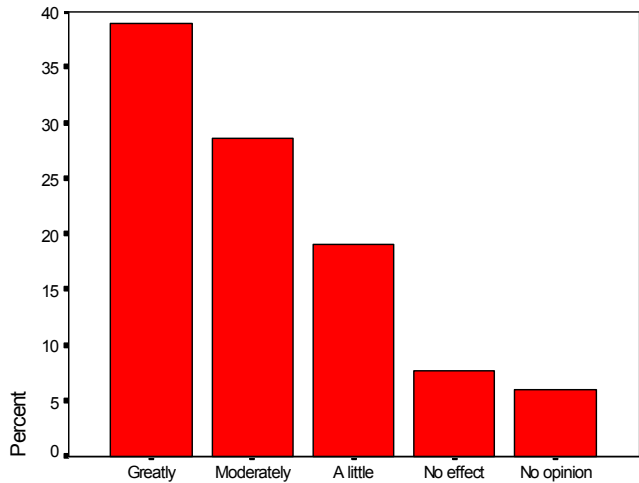


- Yes -in certain condition - Close to HOT expiring
- Yes -in certain condition - Company procedures don't always require it
- Yes -in certain condition - Conditions dictate
- Yes -in certain condition - Couple of times used overwing exits when at HOT expiration & couldn't determine condition & re-icing would be big hassle
- Yes -in certain condition - Freezing rain - tactile check
- Yes -in certain condition - HOT of FZ DR/RN
- Yes -in certain condition - Heavy precip
- Yes -in certain condition - Icing
- Yes -in certain condition - If HOT has expired
- Yes -in certain condition - If HOT is exceeded
- Yes -in certain condition - If I can't see the entire wing
- Yes -in certain condition - If in any doubt at all
- Yes -in certain condition - If uncertain based on precip/appearance of leading edge
- Yes -in certain condition - If we're nearing HOT or precip is increasing
- Yes -in certain condition - Nearing HOT limit in maximum extreme of precip intensity for that HOT condition
- Yes -in certain condition - Only if conditions - precip were "serious" in my opinion ex. freezing rain
- Yes -in certain condition - To perform pre-T/O inspection if OVER "HOT"
- Yes -in certain condition - When HOT has expired
- No - Propeller is next to door

effect) to 3 (greatly) and taking the average of that score, are given below:



C11. Would a signal in the cockpit linked to sensors capable of identifying fluid failure located on areas of the wing where the fluid typically fails first improve safety?



Would sensors for identifying fluid failure improve safety?

[Invalid responses: 50 (3%)]

Average ratings of pilot's opinion of the improvement in safety, found by assigning each level a score from 0 (no

Comments:

- Greatly - \$
- Greatly - A realistic approach at last!
- Greatly - A reliable sensor takes away guesswork
- Greatly - Absolutely - any extra information will help when it comes to identifying fluid failure - unless you can reach out and touch the fluid it is really an educated guess
- Greatly - Absolutely a terrific idea. As aircraft become longer, more crowded, it becomes more difficult to physically assess from cabin/cockpit snow/ice contamination
- Greatly - Absolutely important
- Greatly - Absolutely!
- Greatly - Absolutely. A device of this nature would be the next best thing to a "hands-on" check. Frankly, it is impractical & difficult to safely access upper wing surfaces on a large a/c away from the gate. Visual inspection from inside the cabin generally amounts to "I guess it looks OK" there really is NO certainty
- Greatly - Added security over & above HOT Must be a reliable and simple system
- Greatly - All other methods are pretty subjective. Sensors on wings would be much more objective
- Greatly - Along with cockpit sensors, deicing at runway apron would virtually eliminate deicing problems at most major airports
- Greatly - Am assuming we're talking about the shearing capability of the residual fluid on the critical surfaces?
- Greatly - An automated method of detecting ice accretion and/or fluid failure would be immensely useful

- Greatly - Another tool if it is reliable
- Greatly - Any extra input into this obscured judgment would greatly improve safety
- Greatly - Any improvement in sensing possible ice contamination would improve safety
- Greatly - Any improvements in detecting wing or tail icing is a great improvement. Trying to move the margin of safety to 100% is always best for the airline and the public
- Greatly - Any resource that can improved the decision making process will improve safety
- Greatly - Any tool you can use to make a better safety decision is a good idea
- Greatly - Anything is better than our present procedure
- Greatly - Anything more accurate than a visual inspection should help
- Greatly - Anything that makes a subjective judgment into a hard fact improves safety by eliminating guesswork and human error
- Greatly - As long as it doesn't lead pilots into a sense of false security
- Greatly - As long as it is reliable and doesn't negatively condition pilots with false alarms
- Greatly - As long as the equipment could be relied on, it would take a lot of the guesswork out of the equation
- Greatly - As long as there is backup sensors and systems
- Greatly - As long as they were reliable
- Greatly - Assuming the system is highly reliable
- Greatly - BUT only if it did not generate false alarms & confidence in its accuracy & reliable was high
- Greatly - Backup to HOT
- Greatly - But I suspect just like many other icing indicator it would become too sensitive and another thing to hang pilots with at an inquiry board
- Greatly - But how reliable will this be?
- Greatly - But only if it is proven the system works in the worst of conditions otherwise, doubt about a clean wing still exists without a visual inspection
- Greatly - But only if the reading is very accurate. Even a hint that the warning is not truly an ice warning would soon be ignored by the pilots as a nuisance light
- Greatly - But only if used in conjunction with all other useful verification methods
- Greatly - But still would not be 100% reliable (False indications, etc.)
- Greatly - Cost prohibitive I believe for the # of times it would be used
- Greatly - Current visual method is very subjective
- Greatly - Currently no proven guidelines exist - anything improvement is an improvement
- Greatly - Definitely an advantage to have a remote sensor to detect fluid failure
- Greatly - Depending upon its reliability and the extent of the wing surface monitored
- Greatly - Depends on how well the system works
- Greatly - Don't know much about this type of system but I like the concept
- Greatly - During bad light or if the ice is thin and clear, you can't see the ice from the cabin
- Greatly - Especially at night when it's difficult
- Greatly - False alarms & system malfunctions, I believe, would be common
- Greatly - Fluid can still fail within the time limits (HOT), so having a light in the cockpit would greatly enhance safety
- Greatly - Given all the variables (lighting, passenger sitting by the window you're using to see the wing, difficulty of discerning fluid condition visually, etc.) a sensor would be great
- Greatly - Gives another piece of information to make an intelligent decision
- Greatly - Good cross-check for visual "human" inspection
- Greatly - Good idea
- Greatly - Great idea! Also heat system to prevent "black ice" would be great on tail mounted engine type a/c
- Greatly - Great idea; something we hope FAA will get off its ass and mandate.
- Greatly - Help out a lot during night & low visibility operations & also during freezing drizzle/rain
- Greatly - However I would not trust them & would not depend on them solely. I would look at them only as an additional aid
- Greatly - I feel it would make an expired HOT much safer when combined with a signal. The crews I've flown with tend to return to the gate when a master caution chimes, but rarely when only judgment prevails. Sad but true
- Greatly - I flew a Fokker 100 with a test probe. I don't think it worked unless we were in danger - we deiced to prevent such a situation so I don't know how good it worked because it never went off
- Greatly - I really hope we can go to something like this - as I've said before, the visual inspection of the wing from the cabin is questionable at best especially at night-it's impossible
- Greatly - I rely primarily on HOT table info since leading edge of wing and little of wing top is easily visible in some lighting/precip conditions
- Greatly - I still think a visual inspection would be a good idea even with sensors
- Greatly - I think it would be the next best thing other than being able to touch surface
- Greatly - I think it would improve greatly, but I'm always leery about sensors-they can fail. Would need some sort of redundancy
- Greatly - I think this is a great idea. I feel pre-takeoff wing inspections are not a good way to determine fluid failure and are only required to make the passengers feel more comfortable
- Greatly - I think this would be good thing but question reliability of such a group of sensors and the cost benefit, if only used "several" months out of year doubt if would be working when needed
- Greatly - I would like the option to visually check wing to verify sensor signal. I would like the option to override sensor signal if my visual check is satisfactory
- Greatly - I would support this 100%
- Greatly - I'd like to know how this is possible but, yes this would make these decisions no-brainers. Also F/O's wouldn't have to get out of his comfortable?? seat

- Greatly - I'll vote for anything that gets us away from visual inspections from inside a/c just prior to departure. I don't think visual insp. have much value in most cases
- Greatly - I've already said it - visual check has holes in it
- Greatly - Ice lights have been unreliable in the past. Sensors must be proven reliable and the confidence of the pilots in the signals must be high
- Greatly - If accurate
- Greatly - If fluid fails you should re-deice
- Greatly - If it is accurate & reliable
- Greatly - If it was reliable?
- Greatly - If it were reliable
- Greatly - If it would enhance the safety of even one flight it would help
- Greatly - If not a cockpit indicator, I would equally rate a trained technician with an optical viewing device located in a 600 m truck very near the takeoff point
- Greatly - If nothing else it gives a more scientific basis to base a decision. Not just a "I think it looks good"
- Greatly - If reliable
- Greatly - If reliable
- Greatly - If reliable
- Greatly - If reliable
- Greatly - If signals could be proven reliable
- Greatly - If such a system was accurate and reliable, it would be wonderful
- Greatly - If such technology exist - use it!
- Greatly - If the sensor is accurate, obviously
- Greatly - If the sensors are reliable
- Greatly - If the sensors were reliable
- Greatly - If the sensors would not give false signals
- Greatly - If the systems worked and were reliable
- Greatly - If they really are reliable, & don't just add more uncertainty
- Greatly - If they really worked
- Greatly - If they were credible and not crying "Wolf" all the time
- Greatly - If they work properly. False alarms would be ignored "wolf"
- Greatly - If they work!
- Greatly - If this isn't the total solution it is a long way toward a total solution
- Greatly - If! It works... If the new system gives lots of false warnings & causes a lot of re-deice situations, no one will have any confidence in it - I do not have any info on how these systems work or what they call ice..
- Greatly - Is an effective sensor available, is it reliable?
- Greatly - Is such a device available?
- Greatly - It is definitely a judgment call-an art not science- in determining if you had a fluid failure - a sensor would help
- Greatly - It would be concrete evidence, rather than opinion based on what you see or can't see
- Greatly - It would be helpful to have a series of sensors installed on the a/c in which to take an average of ice buildup rather than just a sensor located only on one part of the a/c. Similar to fuel tank densimeters calculations
- Greatly - It would create an absolute & identifiable time which could not be pushed, crews could not push the limits
- Greatly - It would definitely take most of the guess work out of the equation
- Greatly - It would eliminate the guesswork
- Greatly - It would give me 1 more piece of information to determine if my wing is clear
- Greatly - It would make a subjective choice to an objective decision
- Greatly - It would take away some of the guesswork
- Greatly - It would take the guess work out of the visibility issue
- Greatly - It's a clue that you need to check it again!
- Greatly - Just one more indicator of the need to check surface condition. Everything helps
- Greatly - Long overdue - needed to improve safety - need it now
- Greatly - Mandatory in icing conditions
- Greatly - Many conditions make it difficult to assess the condition of the fluid and/or wing/control surfaces. Cockpit sensors/signals or a camera/TV combination would obviously enhance safety
- Greatly - Maybe just a person checking wing with good lighting to T/O would even be simpler
- Greatly - More info. More than we have now
- Greatly - Must have this on MD-80 aircraft
- Greatly - My guess is we would never be able to takeoff because of delays
- Greatly - Need good, simple, reliable, sensors
- Greatly - Need to be reliable (no false indications) easy to maintain and cost-effective
- Greatly - Needs to be very reliable though
- Greatly - No doubt about if it's reliable
- Greatly - No guesswork from the cockpit
- Greatly - No matter how much training you have, initial or impending fluid failure is still a subjective call. Anything that takes out the "guess work" is an improvement
- Greatly - No question it would greatly improve
- Greatly - Not only helps with the wing, but I hope to have sensors on horizontal stab
- Greatly - Of course it would
- Greatly - Of course it would but better visual inspection is more important
- Greatly - Of course, as long as the sensors are accurate
- Greatly - Only if PROVEN reliable
- Greatly - Only if they were accurate & reliable
- Greatly - Only if they were reliable
- Greatly - Overall, determining fluid failure is primarily a subjective process. A RELIABLE device to reduce the subjective factor would obviously be of great value
- Greatly - Particularly tailplane
- Greatly - Physical check by airline or airport "Not pilot" should be implemented
- Greatly - Pilot should be allowed to depart with this indication of breakdown
- Greatly - Reconfirmation
- Greatly - Reduces subjectivity. With training in how sensors operate (and test), confidence in clean wing will be enhanced

- Greatly - Reliability would be critically important since pilots would come to depend on such a system-TCAS is a good example of this
- Greatly - Right now FAA is only helping pilots get loss of life, or by creating HOTs but better deice situations. FAA only wants to hang pilots or blame them in a wreck
- Greatly - See comments C7
- Greatly - Seems to make great sense
- Greatly - Sensors in the wing would greatly improve safety and take the guesswork out of identifying fluid failure
- Greatly - Sensors on wing would be very beneficial to safety
- Greatly - Sensors would reduce margins of error in assessing conditions on surfaces. Would be a valuable tool for flight crews
- Greatly - Still need deicing near r/w - biggest problem is not fluid fail due to precip but time
- Greatly - Still require visual check and HOT
- Greatly - Such a device may have questionable reliability, but would at least give me more information from an area I can't see. An alert from it would prompt further checking
- Greatly - Sure, if it is accurate. Especially if fluid is failing earlier than the HOT
- Greatly - Takes much of the "guess" out of the difficult/impossible visual assessment from the cabin aisle
- Greatly - Technical improvements always welcome, if the function improves ability for accurate assessment, however cost-effectiveness no doubt would be factored into its implementation. Perhaps an end of runway manual (external) inspection by deicing personnel
- Greatly - That would help immensely!
- Greatly - The MD-83G has ice-fod annunciators but do not indicate condition of leading edges. Only area on the wing that may lead to ice ingestion
- Greatly - The more accurately the condition of the fluid can be determined, the safer the operation will be
- Greatly - The more indicators we have that the fluid has failed the safer our operation will be
- Greatly - The more input to the cockpit, the better to aid the Captain in his final decisions
- Greatly - The more ways of identifying fluid failure the better
- Greatly - The pre-takeoff inspection is the weak link in the chain
- Greatly - The sensor should be reliable and not apt to miss identify such events. This would be a great help.
- Greatly - The wing of the B-757 is extremely difficult to determine fluid failure, especially at night. Trying to look over a row of three pax is nearly useless, especially at night
- Greatly - There can be a great deal of uncertainty when the HOT is approaching the limits - a reliable system would help greatly to clear up any - questions flight crew might have
- Greatly - There is not a single transport a/c (121) with a pilot capability to visually assess the ENTIRE wing prior to T/O
- Greatly - This assumes sensor works
- Greatly - This combined with visual inspection would be ideal
- Greatly - This could very well be the single biggest in safety for icing procedures
- Greatly - This is critically important! It would enhance safety & lower costs & help the environment!
- Greatly - This is the best way to go
- Greatly - This is the only way of accurately assessing the condition of the wing. Looking through the cabin window (even in daylight conditions) is a futile exercise & a waste of time
- Greatly - This is what is needed most. If we knew that the skin temp is >35 (or whatever research determined the proper safe temperature) we could feel confident that ice would not form
- Greatly - This procedure would serve as a backup to visually observing the wing area
- Greatly - This signal should be information only - like the HOT. Signals can be corrupted - especially in foul WX - so I would still prefer to rely on HOT and visual inspection
- Greatly - This would be a great asset to the pilot
- Greatly - This would be an impartial determination - not based on experience level of the pilot
- Greatly - This would be subject to false alarms and system failures of the safety item, but it would be useful
- Greatly - This would eliminate much of the guesswork. Although, ice is not a major problem for turboprops on T/O
- Greatly - This would greatly improve safety if proven accurate & reliable
- Greatly - This would provide more accurate information. This would take the "subjectivity" out of the assessment
- Greatly - This would take a lot of guess-work out of it, and you wouldn't have to send somebody back to the cabin for a check
- Greatly - Type IV fluid, if used, is the best action that can be taken
- Greatly - Until you started having sensor failures
- Greatly - Viewing the wings upper surface from inside the aircraft can only detect a gross failure of the deicing fluid, such as snow accumulation. Trying to differentiate the look of the fluid, its luster, is very difficult
- Greatly - Visibility check is difficult & subjective but I must trust my first officer's judgment
- Greatly - Visual inspection from inside in limited way - anything to help would be an improvement
- Greatly - We need device on B757 due to long wings (which are not visible from cockpit) and lack of surface texture on upper wing surface which would help with visual inspection of upper wing surface for clear ice
- Greatly - We need to eliminate the need for the narrow-body first officer to leave the cockpit immediately prior to takeoff in icing/clutter conditions. This is a very high work load time frame requiring concentration and coordination (and discussion). The F/O should be in the loop, not in the cabin

- Greatly - We're kidding ourselves to think an in-aircraft assessment will detect any but the worst of conditions. This assessment must be done from outside - or by reliable detectors suggested above
- Greatly - What do I know? Sounds great
- Greatly - What might look right from a distance (cabin) might look totally different. upclose
- Greatly - Will never see this device at the commuter level
- Greatly - Wind would make a big difference on where failure occurs
- Greatly - Wing inspection in poor lighting conditions is a "joke" at best. Spray frothy fluid on the surface, in the middle of a snow storm, at night, & I defy you to peer through a passenger window with your flashlight and determine if you have a clean wing with residual fluid or a dirty wing with failed failure
- Greatly - With the great variability in assessment conditions - a cockpit signal from a sensor would be a much more definitive method to determine fluid failure
- Greatly - Without good sensors it becomes guesswork at times - Night heavy precip and close to HOT expiration
- Greatly - Would be a definite signal vice a maybe
- Greatly - Would be especially helpful during freezing drizzle or rain conditions where fluid failure is much more difficult to determine
- Greatly - Would remove the subjective issue of the decision
- Greatly - Would take some judgment from decision
- Greatly - Yes - Please!
- Greatly - Yes! As I've been saying so far I use the holdover tables primary and decrease the time it says I have for safety. I couldn't tell fluid failure rates generally any better than most business passengers
- Greatly - Yes, but don't think it is necessary if procedures are followed
- Greatly - Yes, the sooner the better. It would cause people to pay more attention - wouldn't have to rely on outside personnel for their input
- Greatly - Yes, we're currently in the dark ages
- Greatly - Yet another source of information and should be non-ambiguous
- Greatly - You sort of answered your own question. Can such a device be built?
- Moderately - "Capable" is the problem - possible false warnings or failure to identify
- Moderately - is great but there is o substitute for an experience eye when it comes to something so critical to flight! much like the weather brief>no machine can replace an experience WX briefer! Say I got an idea > why not change the WX doc. to and
- Moderately - A spot sensor only senses that spot. A surveillance sensor to survey a large critical area is also needed. The human eye and hand are the best area and spot sensors I know of
- Moderately - A visual check would still be a good thing to confirm the wing is clean
- Moderately - A visual would still be required to get a warm fuzzy feeling
- Moderately - A visual would still be a must. Conflicting info would be possible creating another "catch 22"
- Moderately - Accuracy of such a sensor would be subject to trial period to build confidence
- Moderately - Additional info
- Moderately - All sensors linked to a signal in the cockpit would be subject to failure and false signals as any other sensor on the a/c. I would use it as a helpful tool but not my sole source for decision
- Moderately - Always subject to failure - just as any mechanical thing, but would be better than what we have
- Moderately - Another input WOULD be helpful of course - it could be another thing that COULD give you bad data
- Moderately - Answer depends on reliability of the sensor
- Moderately - Any additional icing warning signals would be beneficial-but a visual inspection is still the best. I wonder if a sensor would be relied upon in precip as an all clear instead of a visual inspection
- Moderately - Any additional indications would be of great help
- Moderately - Any additional means would be helpful!
- Moderately - Any additional piece of information to be used in determining the suitability of the wing and tail surface for takeoff would be welcome
- Moderately - Any aid is welcome. But human nature would come to use and change this to a crutch. I think pilots would or could push HOT or marginally exceed it. This leads to degradation of safety
- Moderately - Any enhancement to present system will add to safety
- Moderately - Any improvement is welcome
- Moderately - Any method to identify fluid failure would be better than current method. Except perhaps better lighting & cabin windows
- Moderately - Any piece of equipment or procedure is take the guess work out needs. Once while flying a FH-227 we were deiced with cold fluid in icing conditions and after T/O had encountered with ... conditions and returned & found ice buildup on wings. With sensor this might not have happened
- Moderately - Any positive ID of ice is better than the very subjective visual inspection. I also believe that if we get these ice detectors, we will find that they go off during the takeoff run even though we were ice free prior to it. This because the aircraft changes the pressure & temp on top of the wing as a byproduct of creating lift. Lower pressure and lower temp will create ice where there was none moments before
- Moderately - Anything available to assist us (in addition to visual checks) would help
- Moderately - As a confidence issue, there will always be a question of localization - is the fluid good @ the sensors.....?
- Moderately - As with most high tech stuff this thing would not provide me with consistent info
- Moderately - Assuming our HOT's are accurate and conservative, it SHOULD'N'T matter that much. But hey - we'll take 'em!

- Moderately - Assuming the sensors failed safe. I would rather re-deice than have to second guess a faulty sensor. Some kind of I.R. system?
- Moderately - At what cost to the industry?
- Moderately - Awareness and training of wing contaminates is still the most important safety improvement
- Moderately - But at what \$ cost?
- Moderately - But at what cost when looking gives the same information as well as not subject to instrument/calibration errors
- Moderately - But failed fluid does not always necessitate returning for deice. Precipitation, light winds, jet blast all after
- Moderately - Certainly at night in conditions where HOT is close or exceeded any additional input can only improve safety
- Moderately - Conceptually a fine idea. Given the variables of wind direction & other a/c's jetblast, I strongly doubt a point of frost failure could be reliably determined which would always be valid. A sensor blanket across a large percentage of wing is required
- Moderately - Conditions vary so much, that I still think opening the door for a better look, still is the best solution
- Moderately - Confidence factor might be low
- Moderately - Considering I don't even know where on the wing fluid tends to fail 1st- this would help immensely
- Moderately - Current procedures good but I like the idea of another information input
- Moderately - Definitely improve safety but only to the extent of reliability of sensors. Can't only rely on sensors
- Moderately - Depending how reliable system would be. However at night if we can depend on it, it would be good to be used in addition to holdover times
- Moderately - Depending on the reliability of the system?
- Moderately - Depends how sophisticated this system would be
- Moderately - Depends on accuracy of instruments
- Moderately - Depends on accuracy of sensors, did not trust ice sensors of previous aircraft
- Moderately - Depends on reliability of system, and whether or not it is sensing a small area or larger area
- Moderately - Depends on system reliability
- Moderately - Depends on the system and your faith in its reliability and operation
- Moderately - Developing a better system of deicing near runways-or less delay after deicing before takeoff, would be more valuable to me than a warning light. I have confidence in the deicing procedures, fluid (esp. Type IV) & HOT's-but the time required to taxi & takeoff after deicing can be too long
- Moderately - Do we have this technology without a bunch of "false" readings/warnings? Whenever you add another "black box", you're removing some human judgment/common sense
- Moderately - Don't know how they work. I would assume they would help
- Moderately - Don't know if I would trust it
- Moderately - Especially at night
- Moderately - Especially at night
- Moderately - Especially for night flying
- Moderately - Especially on high wing a/c. The system would need to be simple and reliable in order to justify its existence in my opinion
- Moderately - Every input helps
- Moderately - False indications may be problematic
- Moderately - How reliable could sensors be? False alarms would lead to distrust by flight crews. How often would the sensors be placarded "INOP"?
- Moderately - However, there are better areas for ALPA to spend money and for better areas for industry to spend money. How about PIT or DEN style rapid deicing areas at more major airports
- Moderately - I am concerned that gadgets will give a false sense of security. Sensors are good if not relied upon while avoiding the obvious
- Moderately - I feel a sensor would greatly improve safety, but if sensor fails, feel it should be a *nogo* item. Once a sensor is used, pilots would use this as the bible and not visually check. This should be incorporated along with present procedures
- Moderately - I feel that with our new fluids & HOT we are safer than ever before. A signal would improve safety but at what cost? Are we over doing this now?
- Moderately - I might be better able to answer if I knew how well the sensor worked
- Moderately - I think some sort of sensor would be an improvement over trying to inspect the wing from a cabin window, especially at night
- Moderately - I think that the impact on safety would be less than the impact on schedule reliability. I think that questionable decisions to return for deicing would result in more takeoffs
- Moderately - I think we have a very safe system now, but this would certainly be better
- Moderately - I would be concerned about a system like this. Reliability
- Moderately - I would mistrust a sensor, I would probably have the wing still visually checked
- Moderately - I would not feel comfortable letting a sensor make the decision. There are simply too many variables for a sensor to be all effective. I have used many sensors/deice equipment and all have their limits
- Moderately - I would question reliability factors
- Moderately - I would question the reliability of such a system. Corroborating visual inspection would still be required
- Moderately - I would specifically say moderately for turboprops and a little for jets
- Moderately - I'd have to know more about them to make an informed decision however
- Moderately - I'm not convinced anything other than a visual inspection is best means of determining wing condition
- Moderately - If designed properly it probably would improve safety
- Moderately - If indications were accurate and could be verified visually
- Moderately - If it could be done, how about a live person at end of runway

- Moderately - If it is proven reliable, may greatly improve safety
- Moderately - If it was a reliable sensor
- Moderately - If it were reliable/dependable enough to differentiate between failed fluid & deicing fluid of water on the wing
- Moderately - If it worked reliably with a very small false alarm percentage, it would be useful
- Moderately - If reliable
- Moderately - If sensor installed - must have procedures to preclude total reliance on sensor to identify fluid failure
- Moderately - If sensors were reliable they would greatly enhance safety. Have doubts about the availability of such technology
- Moderately - If such a system really worked
- Moderately - If technology is reliable and cost-effective but it will only be another input subordinate to the trained eye
- Moderately - If they didn't fail
- Moderately - If they were very accurate and dependable otherwise you're just adding one more subjective decision based on marginally accurate information
- Moderately - If this signal was reliable. Sometimes on A320 square electrons cause temporary weird thing which generally fix themselves
- Moderately - Is that even 100% accurate?
- Moderately - Is there such a sensor available
- Moderately - It is a safety concern, however, we all know systems fail and someone dependent on a sensor and not his/her own eyes, may run into trouble. It can't hurt to enhance safety with proper training of sensor function.
- Moderately - It sounds good
- Moderately - It would be a good supplement to a holdover time
- Moderately - It would be an aid but not to be the only indicator of go or *nogo*
- Moderately - It would be great to reduce some visual requirements and give an initial indication to check further
- Moderately - It would be objective at least
- Moderately - It would help make a *go/nogo* decision or at least a decision to make a cabin check vs a cockpit check. I would think a piece of equipment like that would give a lot of false warnings and it would end up being deferred most of the time anyway
- Moderately - It would need to be a proven system
- Moderately - It would take a lot of the guess work out of the problem
- Moderately - Just one more maintenance problem potential
- Moderately - Like GPWS, system would have to be bullet proof to be credible - false failure modes would lead to pilots ignoring the signal at the worst possible time
- Moderately - May reduce necessity to re-deice if holdover times are exceeded
- Moderately - Maybe-no experience with this type sensor
- Moderately - Most commercial aircraft can only be looked at prior to pushing from gate. Any changes after that are harder to see
- Moderately - Most of the time it can be visually determined if the fluid has failed. A detection device would foolproof those times that visual cues are not 100% accurate
- Moderately - Must be proven to show when fluid has actually FAILED and not just conditions could cause fail. i.e. Pilots must be convinced of the reliability and accuracy of the signal
- Moderately - Need to be used combined with assessment of precip. rates & observation outside the a/c by trained personnel. Know industry fights this due to cost but we have industry that only improves safety after a few life losses
- Moderately - Need to use common sense & good judgment, not another MEL item!
- Moderately - Not adequately familiar with this technology
- Moderately - Not needed during daytime ops, a thorough cabin check suffices. At night however, it would improve safety greatly
- Moderately - Not sure how well it would work
- Moderately - Not worth the expense - present method works very well
- Moderately - Nothing like 1st hand look see - sensor would be great but still need to look
- Moderately - Obviously depends on accuracy of sensors
- Moderately - Once this system indicator begins to fail or be over-sensitive, I believe it would be ignored
- Moderately - Only if indication would give a no go not a go indication
- Moderately - Only if system reliable
- Moderately - Pilot observation should be of equal importance
- Moderately - Pilots monitoring of local conditions should always be the primary determining factor even if sensors were installed (i.e. electrical or mech. failures of the sensors)
- Moderately - Possible that a group (i.e. pilots, mechanics, bean counters, etc.) could rely on system TOO much
- Moderately - Probably - Don't have enough info to know
- Moderately - Reliability of sensor could be questionable
- Moderately - Sensors are not 100% fail-safe
- Moderately - Sensors are subject to beep also, and can give wrong information. If technology can produce a perfect one, I'm all for it
- Moderately - Sensors could lead to "mandatory" re-deice without allowing Captains decision as final, but it would help in C.R.M.
- Moderately - Should still do a visual check
- Moderately - Some of our aircraft have wing sensors
- Moderately - Sounds great if it truly can be done with reliability
- Moderately - Sounds like a plausible idea. The human factor in these determinations is too great
- Moderately - That would be nice but sounds expensive. A few enhancements to training and procedures in place now would be better
- Moderately - The ice sensor location & design is a definite improvement but does NOT replace the ability to see the critical surfaces from the cockpit
- Moderately - The signal would greatly enhance crew confidence in the takeoff/no takeoff decision process

- Moderately - There is an implied assumption with this question that fluid failure also means icing occurring. I am not sure this is always the case
- Moderately - There is danger that the deicing crew may do an "extra good job" around the sensors
- Moderately - There is still the possibility of a typical situation
- Moderately - This would add to information available through current procedures-but could not substitute for visual and/or hands-on inspection
- Moderately - This would be a good aid if used in conjunction with visual checks, and if proven reliable
- Moderately - This would be another tool to use in the decision-making process
- Moderately - This would help, combining it with my own personal assessment to make my *go-nogo* decision
- Moderately - This would take away possibility of human error for newly trained F/O who does the visual inspection
- Moderately - To IMPROVE safety there first has to be a problem - is fluid failure (unreliable HOT) a problem? I don't know
- Moderately - Too many "false warnings" & return for unneeded re-deice would lower pilot acceptance - would have to be proven reliable
- Moderately - Too many variables. Should still look visually
- Moderately - Unless you are deiced for frost and there is no precip, then it really wouldn't matter
- Moderately - Visual/tactile check is best but sensors could give a bit more assurance that visual cues are accurate - not a stand alone system - sensors fail
- Moderately - We must still inspect visually. This would be just another aid like inflight ice detector
- Moderately - We probably don't need another sensor to malfunction
- Moderately - Well-prove to me that it is infallible-one thing I know about new technology-it does fail-I can't afford that one failure under these conditions-if this GISMO leads people to stop using tactile and visual senses-then it will cost lives!
- Moderately - With visual confirmation, would help eliminate confusion
- Moderately - Would be great to have a backup to the visual inspection and would help in the marginal conditions
- Moderately - Would be more likely to reexamine wing if sensor indicated fluid failed
- Moderately - Would definitely be a useful addition to present procedures, but like any other system, would have to be proven to be accurate and reliable before it would be accepted
- Moderately - Would depend on accuracy and reliability of system
- Moderately - Would have to have a great number of sensors at many various places - is it cost-effective?
- Moderately - Would help out a lot at night and in freezing
- Moderately - Would probably still want to confirm visually
- Moderately - Would provide confirmation during periods of reduced visibility and poor lighting
- Moderately - Would take a LOT of research to accurately place sensors on a given wing-could still have fluid failure elsewhere
- Moderately - Would work if sensors didn't give false alarms - then they would be trusted. Otherwise, they'd be ignored
- Moderately - You would have one more indicator of failed fluid. Obviously, the more inputs you have the better your decision-making process will be. Just like CRM
- A little - Again, the key to safe T/O's in icing conditions is procedure
- A little - All depend on the reliability of such a system
- A little - Another system to fail. I've seen TCAS, GPWS, and other systems fail or give unreliable information. In the end, it's the pilot who decides which course of action to take
- A little - Any system is subject to malfunction as was proven with the ATR. Until a system we can understand trust is developed I will depend on visual and even tactile confirmation that deicing has been done properly and that there is no contamination
- A little - As long as it is not relied on for the sole determination of fluid failure
- A little - At what cost?
- A little - Being sinister about this, I feel the FAA would merely allow the system to be "INOP'd" and rely on the crew to determine the conditions anyway
- A little - Best means I think will always be human inspection
- A little - But only after research & testing can provide a reliable system
- A little - But this would be very expensive to install & maintain with still no assurance the wing is clean
- A little - Car wash operations at or near runway
- A little - Chances that the sensor is inaccurate or fails itself is more likely. Ice sensors on ATR's gave many false positives
- A little - Common sense is the best safety device
- A little - Could
- A little - Depends on reliability of sensors and complacency on relying on that sensor alone (especially when you're running late!) A good tool!
- A little - Depends on the reliability of the technology to give accurate data
- A little - Difficult to answer. Would depend on the reliability of the sensors and outside conditions. Sensors might be a big help if developed and implemented properly!
- A little - Don't think the expense is necessary
- A little - Even as defined herein, fluid failure does not mean that ice has formed. Sensor should signal snow, ice, etc.
- A little - Every addition you make to an aircraft is just another mechanical liability. They fail too. My company would just MEL it anyway
- A little - For a/c operated in areas where icing is persistent I think it would be a good idea
- A little - Good view of wing from cabin
- A little - Good visual of wing with excellent lighting is best
- A little - How dependable are the sensors?

- A little - How well are they maintained how much of an effect would the temperature of the fuel have on the sensors
- A little - Human visual checks are better
- A little - I am sure it would be much more helpful on other types of a/c
- A little - I believe a visual inspection is best means to determine fluid failure
- A little - I believe deicing (in heavy conditions) - just prior to taking runway would solve all problems regarding HOT and inspections
- A little - I believe these sensors would be hard to trust and could very possibly lead to excessive re-deicing
- A little - I don't believe we have a safety problem now, but I do believe the sensors, if proven to be reliable and effective, would reduce unneeded application of deice fluid
- A little - I don't feel such a system would improve safety enough to justify expense
- A little - I don't feel the cost/reliability factors would make me any more comfortable than I feel now
- A little - I don't have too much confidence in present technology to accomplish this
- A little - I don't know enough about sensors. How they work.
- A little - I don't think we need them often enough to justify the cost
- A little - I don't trust electronics for fluid failure
- A little - I fear the probable false warnings would lead to doubts about the system & ignoring of warnings would result
- A little - I guess it would work
- A little - I like any device which will help make a safe decision. The FAA rule is still "VISUALLY INSPECT". So - how about a device that improves viewing the critical failure area during night and heavy precip?
- A little - I say a little because I believe situations of heavy precip and long taxi delays are now pretty rare
- A little - I still feel the best way is from a mechanic verification after push back in conjunction with a visual inspection before T/O from cabin viewpoint
- A little - I strongly believe a pilot making a visual inspection is the best method
- A little - I suppose this would remove the pilot's judgment from deicing. i.e. must return for deicing any time the sensor indicates fluid failure
- A little - I think a better fix is to minimize the time between deicing & takeoff, unless the sensor is inexpensive & very, very accurate, and never fails (I doubt that is the case)
- A little - I think that pilot judgment is the best tool in this situation
- A little - I think the tendency of the pilots would be to question the accuracy of this type of sensor
- A little - I used to fly a commuter a/c with an ice detector - the alert sounded every time we fly through a cloud - i.e., so much we practically ignored it
- A little - I would need more info on this
- A little - I would not trust s sensor
- A little - I would still want to look at it or have it looked at- sensors don't always tell the truth
- A little - I'd need to know more about how the sensors would sense this
- A little - If it actually worked, I believe pilot direct observation is better
- A little - If sensors are reliable
- A little - If you are going to use a sensor to determine wing condition, either make it fail-safe or don't bother
- A little - If you really want to do it right the aircraft would be inspected just prior to takeoff by a qualified ground person
- A little - Is it fool proof? I know of no one system that is totally reliable and I think some people might put total faith, that this system is 100% accurate, when in fact it may be lying.
- A little - It depends on how the system operates & what info I am receiving
- A little - It depends on the integrity of the sensors
- A little - It may be more convenient but safety would probably not be increased
- A little - It might help someone who is on the borderline of going back to deice. However, I will use something like that in my decision-making process. If I had such a device & posed with questions from C8 I would probably go back to get deiced regardless
- A little - It should have more effect on the bottom line if the pilots re-deice if necessary or uncertain
- A little - It will always remain a judgment call for the pilot
- A little - It would be a great additional tool to use in determining fluid condition. The downside would be that it would be easy to rely on the sensor only, and that would be a step backward toward a dangerous situation
- A little - It would be impossible to place sensors on enough of the surface to be effective
- A little - It would depend on accuracy of instrument. If pilots were trained on more visual clues of the stages of fluid failure, wouldn't that provide the same amount of safety
- A little - It would have to be a standard sensor used by all airlines/aircraft - it should not be left up to each individual aircraft operator to manufacture & install their own sensors
- A little - It would still be more effective to setup deice equipment at departure end of runway(s)
- A little - It's one of those reliability issues. How good are the sensors day after day?
- A little - Judgment is more important
- A little - May help during heavy snow or freezing precip. (rain or sleet)
- A little - Maybe as supplemental info, but there is no substitution for a visual inspection
- A little - Might be a lot of false positives
- A little - Money better spent for hands-on check with qualified personnel. Gizmo's fails
- A little - More likely to get false indications
- A little - My experience with automatic ice detectors is that they are unreliable. Such a system might lead to reduce visual inspections actually decreasing safety
- A little - Need better visual access

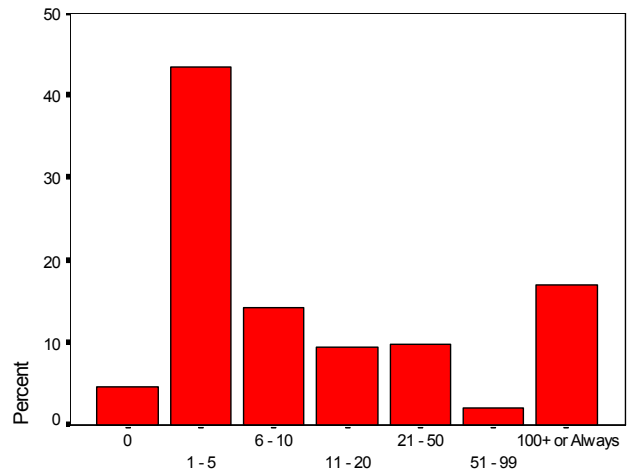
- A little - Need to know more
- A little - No sensor can replace your eyes and hands
- A little - No substitute for a visual check
- A little - No system is failproof/May cause false/positive errors
- A little - Not familiar with this technology
- A little - Not needed at this time. Too costly
- A little - Not sure how well you're going to be able to do this, but you are taking decision process away from pilots
- A little - Once again you seem to be addressing a non-problem on modern equipped aircraft. The old procedures with Type I fluid and good judgment seemed to work fine.
- A little - Only if system did not give false indications if that were the case it would not be trusted
- A little - Only in time
- A little - Pilots might come to rely too heavily on the sensors and not back it up with visual inspections
- A little - Present procedures work quite well
- A little - Probably too many false alarms - I flew the ATR for 2 years; the icing light would illuminate (sometimes) in rain and we would be at the gate (temp +15C or better) "true" rain - no chance of ice
- A little - Providing the sensors were treated equally with the rest of the a/c. i.e. the sensors where treated improperly or overrated the indicators on the flight deck would be inaccurate
- A little - Regardless of what the sensors do or do not say if existing conditions or the HOT required it a check has to be made
- A little - Reliability would be a lingering question. Amount of area covered by the sensor would be critical as well
- A little - Rosemont sensor on ATR was not very reliable- lots of false warnings. We came to not overly trust it. The best ice sensor is a set of EYES, and a very obvious & easily viewed portion of wing/prop
- A little - Snow is easy to check. Freezing rain is difficult to see. A sensor might be useful in freezing rain conditions
- A little - Seems like procedures currently in effect do
- A little - Seems like that would be expensive to install and would it actually work? I like visually inspecting my aircraft seeing is believing
- A little - Sensors & ice detectors are prone to failure and their sensitivity may give a false alert. I prefer visual inspection
- A little - Sensors are an input. I would always question reliability. Conservative decisions are better. Additional info is good
- A little - Sensors can fail or be unreliable experience and training are required
- A little - Sensors can give false warnings, after several false indications crews would ignore the sensors
- A little - Sensors could fail and complacency that they may generate could be a problem. I would depend a great deal on their reliability etc.
- A little - Sensors could fail. Visual is the only way
- A little - Sensors fail too!
- A little - Sensors would only supply a very small portion of the wing. I think you would end up with "positive falses"
- A little - Since the monitor would only be used part of the year reliability would be a concern. In addition if it is an MEL item it might be deferred on the day it's really needed thus negating its purpose. Pilot judgment is still the best tool
- A little - Sounds like something that could break-no warning when there's a problem-false warnings. I still think a hands-on inspection at the hold short line by someone outside the a/c is the way to go
- A little - Suspect sensors could not be accurate - would still need visual
- A little - System would have to be reliable under a wide range of conditions i.e. temperatures and fluid types
- A little - Tactile inspection is the ONLY reliable 100% method
- A little - The key is with the pilot siding on the conservative side of these decisions not gauges. Pilot training & education
- A little - The only sure way is to go back and look at the wing. Sensors will always have the potential to be inaccurate or fail
- A little - The procedures in place in the last few years I think have made our ops quite safe. Sensors would be expensive and at times a nuisance if not calibrated
- A little - The reliability & accuracy of the sensors would have to be considered
- A little - Think cost/confidence level wouldn't sell me. Tactile then visual best
- A little - This would not be a substitute for a visual inspection. The reliability would be questioned
- A little - To truly increase safety, the device would need to do a better job at detection than a flight crew member following SOP's
- A little - Too high of false warning
- A little - Under those conditions where you would probably not return to deice again (HOT not expired, and no sign of contamination) would provide a backup
- A little - Visual inspection is still the best
- A little - Visual inspection still best
- A little - Visual or tactile still better
- A little - WX temperature and conditions are never the same. Use your best judgment as to the SAFE OPERATION of your a/c within the approved guidelines
- A little - We cannot engineer safety
- A little - We don't need anymore regulations or gadgets
- A little - What's the reliability of the sensors? I don't have them on my aircraft
- A little - Would I trust a sensor?
- A little - Would depend greatly on the accuracy of the device. I would be concerned about inaccurate sensing of fluid failure and resultant time lost in unnecessary return visits to the deicing pad
- A little - Would depend on how accurate they were
- A little - Would have to be nearing 100% reliable without false warnings to encourage crew use
- A little - Would just be one more small piece of the puzzle to help make the decision

- A little - Would still want to take a look. I would like remote TV cameras capable of zooming to a spot on the wings and horiz. stab.
- A little - Would want system that doesn't provide false warnings
- A little - You can't solve everything by throwing money at it - mechanical systems can fail - Education
- A little - You must have some trust on deicing crew. The a/c is clean or it's not. I fly out of Mexico a lot. We don't check the fuel. There is bad fuel (water in fuel) outside this country
- No effect - Added expense & possible equip malfunctions, make this unnecessary in B767/757
- No effect - Another hurdle relying on what's probably dubious automation - another remove the human
- No effect - Common sense is more important to deice/anti-ice conditions than any GIZMO or holdover table or bureaucratic procedures
- No effect - Confidence in the system must be standard
- No effect - Considering the RECENT number of takeoff incidents due to icing I don't think installing sensors is going to improve the safety record
- No effect - Could even give a false sense of security
- No effect - Current procedures are adequate
- No effect - Do not want a sensor deciding condition of my aircraft for me
- No effect - Don't put another idiot light in my cockpit!!
- No effect - False indications/malfunctioning of equipment could lead to more problems
- No effect - Give me a break. We don't even have AOA indicators. Besides, show me the reliability figures on that idea
- No effect - How can equipment failure be detected? Only a human capable of thinking is qualified. Station one at the hold short area
- No effect - I believe we'd see a horrendous increase in costs associated with false warnings
- No effect - I can't imagine such a maintenance boondoggle! Confidence among pilots would be minimal and inspections combined with HOT & assessment of temp & precip rates will always have to influence decision
- No effect - I don't believe anything less than a hands on inspection is acceptable. This isn't something to take lightly
- No effect - I don't know if it would improve safety but it would make the decision a lot easier - as I'm sure we would be required to return for deice if the signal went off
- No effect - I don't think a probe would give an accurate and consistently reliable indication of icing. Visual inspection and HOT parameters are preferable
- No effect - I don't trust the technology
- No effect - I don't want to rely on an electronic sensor for this decision
- No effect - I doubt if I would trust the reliability of such a system
- No effect - I question the reliability of this type of system
- No effect - I think pilot judgment is the most important determinant - soon we'll have too many gadgets, sensors in the cockpit
- No effect - I think the combination of conservative, holdover times, a good visual check and common sense is sufficient. Any detector could have to check numerous areas and may lead to complacency. A picture or a visual check is worth a thousand words
- No effect - I think we have enough whistles, bells, horns, lights and other gadgets. Use some common sense!
- No effect - I want to look myself
- No effect - I would have no confidence in a sensor in preference to visually or tactile checking wing
- No effect - I wouldn't trust a "sensor"!
- No effect - I wouldn't trust it. Visual inspection is best. Technology can't replace human judgment in this area
- No effect - If you analyze past airline ice accidents, most are caused by poor pilot technique & judgment, not because of the contaminates themselves
- No effect - In fact it may reduce safety (i.e. idiot lite)
- No effect - In my opinion, the only reliable way to identify the condition of the aircraft is a certified inspector, with equipment, at the departure runway, just before the takeoff roll. No airline will do it, because of cost!
- No effect - In the long run would it become another "idiot light"? Would it carry flight data recorder accountability?
- No effect - It might help on some a/c that are more prone to ice such as the MD-80. However, a/c like the B-727 or DC9-30 would be adversely affected by having to deice a second time unnecessarily
- No effect - It would take years for pilots to believe a sensor without looking to back up what the sensor is saying (in most situations)
- No effect - Just because sensors detected fluid failure doesn't mean that the wing is contaminated!
- No effect - Just what we need. More warning lights & buzzers
- No effect - Just something else to go wrong and wouldn't trust it anyway
- No effect - Looking at the surface eliminates faulty indicators
- No effect - Most of winter flying hinges on common sense & these sensors could be more of a potential for problems than a solution
- No effect - New technology will have not effect unless pilot receive better training and use good judgment. We are moving too far towards technology and to far away from good instincts. We have to combine seat of pants skill WITH technology
- No effect - No substitute for good judgment & a visual check
- No effect - Not substitute for visual inspection & good judgment
- No effect - Nothing beats visual checks
- No effect - Once again, the answer is simple. Deice at runway, launch immediately. We are trying to find ways around the obvious because the FAA can't see the Forrest for the trees. Why are we accommodating a failed ATC system and timid local airport authorities
- No effect - One more *nogo* item - use common sense/eyes & training
- No effect - One more thing to become inop.

- No effect - Only visual outside hand inspections will improve safely. Sensors can fail!!!
- No effect - Pilot must visually inspect surface for best assessment - failures/incorrect warnings or non-warnings by electronic system too risky
- No effect - Pilots would tend to rely on sensor to the exclusion of good judgment or sensor calibration/reliability would cancel many flights unnecessarily or both
- No effect - Probably wouldn't work, if it did the airlines would be too cheap to buy it
- No effect - Right now, with the procedures used at the major airlines, it is an extremely safe way to operate in adverse weather conditions. I do not or have not flown on aircraft with high wings that are not visible from cockpit or cabin, so that's a separate issue
- No effect - Safety in this matter is found in slowing down a bit and using basic common sense
- No effect - Sensor may fail. Visual check is best
- No effect - Sensors of this type are extremely inaccurate
- No effect - Sensors would be "second guessed"
- No effect - Sensors would fail
- No effect - The majority of serious problems we've had i.e. crashes, were the result of pilots not using equipment already installed like wing & engine anti-ice
- No effect - Too ambiguous unless supported by other factors (HOT, changing WX, etc.)
- No effect - Too many variables could give false signals. A visual check is best
- No effect - Visual inspection still critical
- No effect - Visually checking wing surfaces works just fine
- No effect - Waste of money
- No effect - We are more the safe now, it would be overkill!
- No effect - We have enough trouble with a/c sensors/systems without putting one on wing in a corrosive environment that would probably fail and cause more "gray" areas
- No effect - We haven't had a problem using our current procedures. Sensors are expensive, I'm sure
- No effect - We will have a great deal of extra deicing for no reasons
- No effect - Yet another system to monitor will do little to improve safety. How to monitor failure of the system itself? Fluid failure is easy to predict-the current time based system is fine
- No effect - ////////////////
- No opinion - A MX problem for older a/c
- No opinion - Cost of system reliability, and maintaining the system will make it too costly
- No opinion - Could get false warnings
- No opinion - Depends on reliability of the system
- No opinion - Depends on the accuracy and reliability of the equipment
- No opinion - Don't know available technology/capability
- No opinion - Economic cost?
- No opinion - How reliable are these sensors?
- No opinion - I always check from cabin. I don't see sensors IMPROVING the caution that I already take
- No opinion - I am not sure - If the a/c can be deiced closer to the T/O time and more ground support provided for safe confirmation the need for sensors is too much technology
- No opinion - I don't think necessary - and not as accurate as human judgment
- No opinion - I have no idea
- No opinion - I tend to be leery of a system such as this. Conditions are so variable, wind moisture, temp. How can you trust a sensor that can be affected by so many things
- No opinion - I want the "GO/NO GO" decision to be mine not a light. However a system warning of the "potential" of fluid failure would help in my decision process
- No opinion - I would have to know the reliability rate of the device and how effective I thought the sensor is
- No opinion - I would have to see it to believe it
- No opinion - I'm not familiar enough with this device to comment
- No opinion - If the sensors were reliable, and were used in conjunction with current procedures; would be a help in poor visibility decisions. I'm not sure that a system of dubious reliability as an indicator is worth the expense
- No opinion - It might, hard to know, we don't have a sensor system
- No opinion - It would depend on how accurate this device is
- No opinion - More stuff to consider. New idea. Check it out. I'm all for safety items but if they aren't reliable they are worst than nothing. Car wash still good idea
- No opinion - No experience
- No opinion - Not much room for more equipment
- No opinion - Not needed on DC-10. Would have more problems from false sensing than we have with no sensing
- No opinion - Not sure I would trust a sensor to make the correct assessment
- No opinion - Probably
- No opinion - Probably too expensive for the number of times used/year
- No opinion - Require more information - I feel it would
- No opinion - Sensors are subject to failure
- No opinion - Sensors can fail or be unreliable
- No opinion - Sensors of this type would be very difficult to maintain
- No opinion - Sensors of this type, are very prone to failure or clogging. Until reliability of sensor on my a/c is proven by "pilots" I have no opinion
- No opinion - Some situations where it is so cold & snowing, I think if you have a clean aircraft you decrease safety by putting fluid on the aircraft to attract the precip.
- No opinion - System would probably break and cause more of a delay
- No opinion - Weight of ice on fuselage? Tail surfaces?
- No opinion - Would have to know more about a particular system
- Inv. resp. - Depend on how the information is used
- Inv. resp. - Depends of sensor system of reliability of components/design to accurately detect fluid failure

- Inv. resp. - Depends on what means the sensors use to determine fluid failure. Any signal is better than none. At least it raises your awareness level and may cause crews to take a second look (less guess)
- Inv. resp. - I can't answer the question without knowing the reliability of the sensors and how the work
- Inv. resp. - I wouldn't trust it, I want visual cues
- Inv. resp. - It would be better to use a remote control camera to look at the wing from the cockpit
- Inv. resp. - It would cause pilots to rely on sensors and not develop criteria for newer pilots to use on their own
- Inv. resp. - Many assumptions here
- Inv. resp. - Maybe - I believe the Power to be making this to complicated. Can we use common sense, judgment and experience?
- Inv. resp. - Not if the sensors failed in only certain areas
- Inv. resp. - Of course, but will it be another device to hand me with?
- Inv. resp. - Probably
- Inv. resp. - Too costly when good alternatives are in place, also, good judgment would not trust the sensor under unique circumstances
- Inv. resp. - Yes. But only if it was reliable

If YES, give number of times a tactile check was done in last TWO winters:



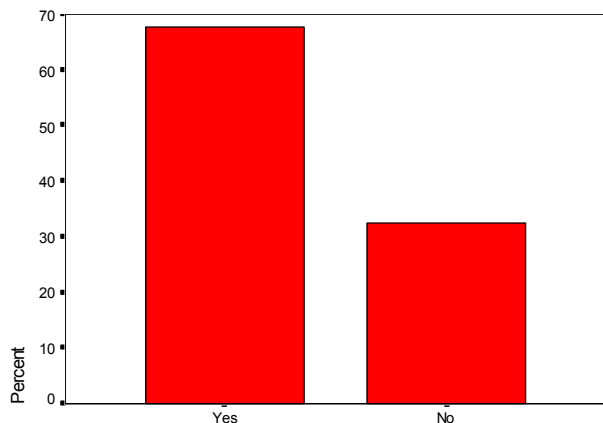
of tactile inspections to determine whether to deice

[Invalid responses: 60 (4%)]

D1. PROCEDURES

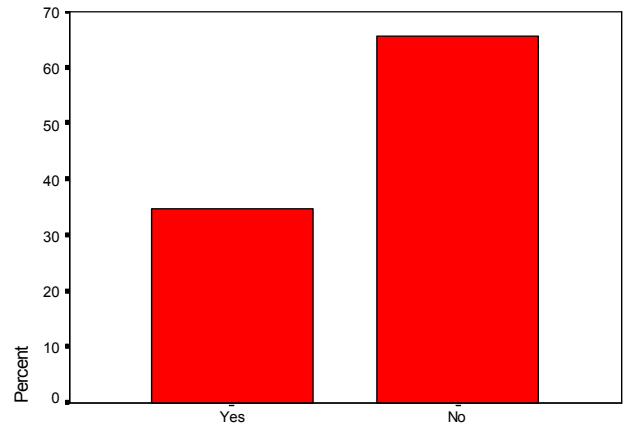
D1. Do you ever request a tactile check of the critical surfaces be done by personnel outside the aircraft:

(a) For deciding whether DEICING is required?



For deciding whether to deice, do you have a tactile inspection?

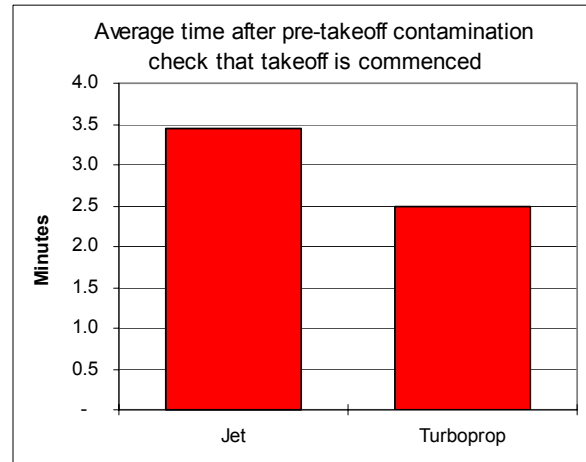
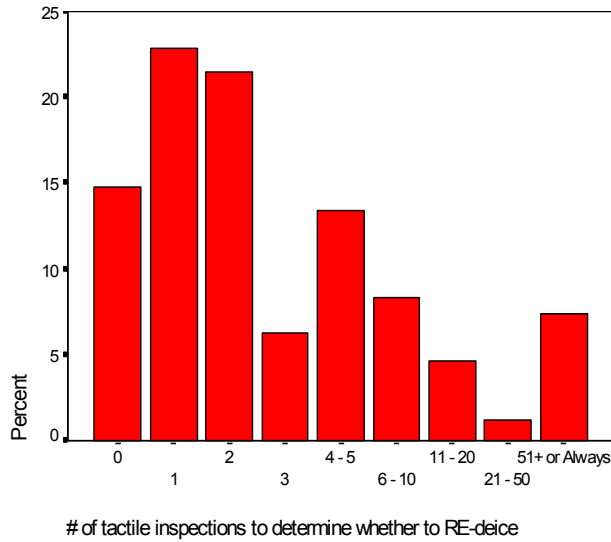
(b) For deciding if fluid has failed and RE-DEICING is required?



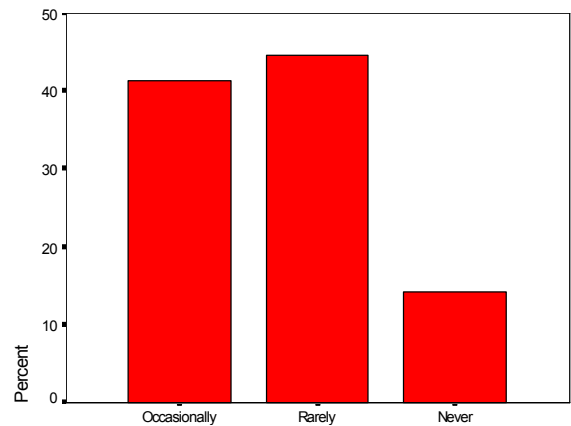
For deciding whether to re-deice, do you have a tactile inspection?

[Invalid responses: 134 (8%)]

If YES, give number of times a tactile check was done in last TWO winters:



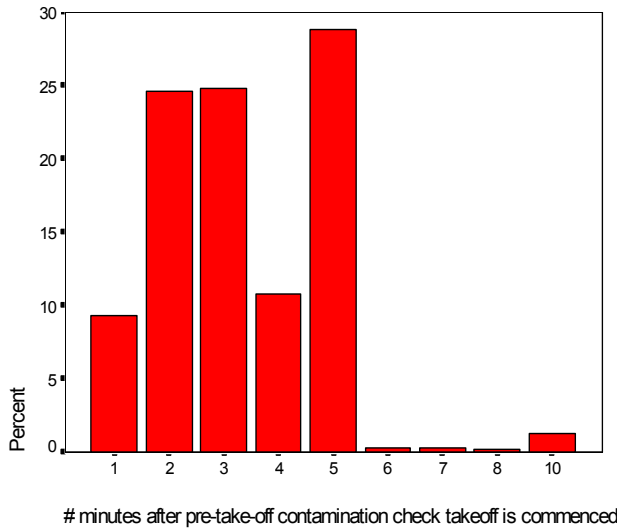
Do you ever require the full 5 minutes allowed for in the operating procedures?



Do you ever require the full five min. between check and takeoff that is

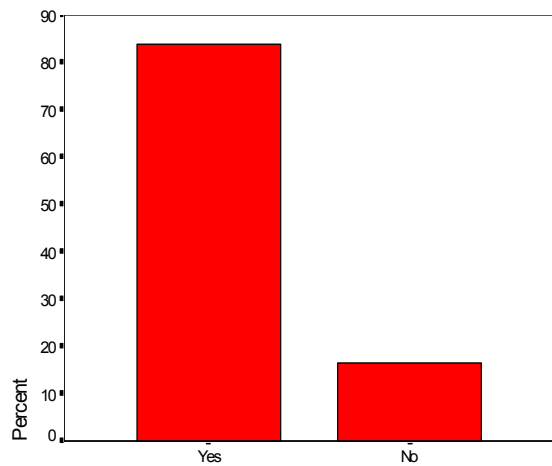
[Invalid responses: 132 (8%)

D2. How long after your visual check of critical surfaces just prior to takeoff (pre-takeoff contamination check) do you typically commence takeoff? (minutes)



[Invalid responses: 155 (10%)

D3. The holdover time tables give a range of holdover times for a specific weather condition. Do you find a range more useful than a single value?



Do you find range in HOTS more useful than a single value?

[Invalid responses: 59 (4%)]

Comments:

- Yes - A range + monitoring precip type + rate + common sense works well
- Yes - A range affords more flexibility
- Yes - A single minimum value would be OK too
- Yes - A single value is not realistic
- Yes - Able to apply actual conditions to table
- Yes - Again the many variables are the driving factor - not just one thing on time
- Yes - Again very subjective
- Yes - Again, all this is an educated guess
- Yes - Again, conditions vary in real life
- Yes - All events (snow, etc.) are situational dependent!
- Yes - All icing conditions are different therefore a "range" is necessary
- Yes - Allowance for variables useful
- Yes - Allows adjustment for different rates of falling precip
- Yes - Allows flexibility during varying conditions
- Yes - Allows flexibility in changing conditions
- Yes - Allows for judgment call
- Yes - Allows for pilots to be more/less conservative based on changing conditions
- Yes - Allows for variables
- Yes - Allows me to use my own judgment
- Yes - Allows pilot judgment
- Yes - Allows some interpolation
- Yes - Allows some judgment
- Yes - Allows subjective bias for existing conditions
- Yes - Allows use of a more conservative value
- Yes - Allows you to choose your time based on your own experience
- Yes - Allows use of my judgment skills
- Yes - Although ops manual no longer states this specifically - interpret range to cover varying intensities of precipitation specified
- Yes - Although subjective - a range allows for more flexibility
- Yes - As WX conditions vary - so do time

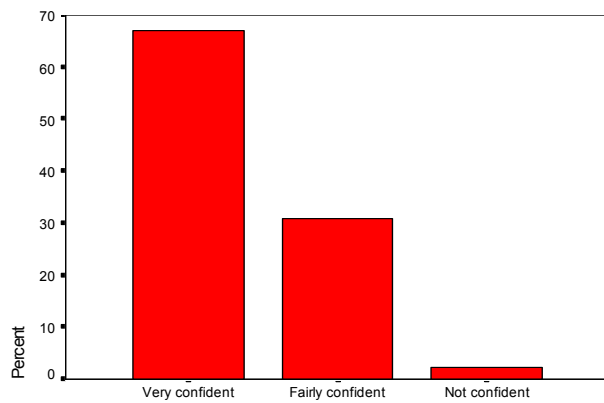
- Yes - As commented on earlier the range of time vs condition is an extremely valuable guide
- Yes - At least you have something to go by
- Yes - Based on light or heavy, it helps
- Yes - Better guidelines in the use of range would be helpful
- Yes - Big range of snowfall
- Yes - Broad range "No footnote conditions"
- Yes - But I consider this merely a guide
- Yes - But a smaller range would be easier
- Yes - But increases chance of error
- Yes - But it put a lot on Captain if things go wrong. I think times need to be a shorter range
- Yes - But some holdover times are unrealistic. If you start timing at the beginning of deicing, the deice procedures take longer than the holdover times
- Yes - But the more specific the better
- Yes - Can use the range for current conditions
- Yes - Can vary time for rate of precip
- Yes - Common sense
- Yes - Conditions are so variable that a single time would be pretty unrealistic
- Yes - Conditions are too variable for a single value
- Yes - Conditions are variable so it's not cut & dry
- Yes - Conditions can change rapidly allows use of judgment
- Yes - Conditions constantly change
- Yes - Conditions vary (**X 6 responses**)
- Yes - Conditions vary and we are for the most part overly cautious
- Yes - Conditions vary to greatly for a single value
- Yes - Continental Exp had (had) this system *see back*
- Yes - Defining specific weather conditions is difficult. i.e. = wet snow? Light to moderate?
- Yes - Definitely
- Yes - Depends on amount of precip & temp
- Yes - Depends on precip type/rate
- Yes - Depends on present conditions
- Yes - Depends on your estimate of the precip
- Yes - Different precip. conditions vs types of fluid used
- Yes - Difficult to put common sense into numbers and words
- Yes - Each WX condition specified varies in intensity
- Yes - Eg: light snow may look like heavy snow to another observer
- Yes - Especially in changing weather conditions
- Yes - Experience & judgment better than ANY table
- Yes - For the most part
- Yes - Give you more leeway in decision making
- Yes - Gives a better guideline for interpolation given the current conditions
- Yes - Gives flexibility for WX conditions
- Yes - Gives more flexibility
- Yes - Gives more flexibility to operate a/c and keep legal
- Yes - Gives some discretion
- Yes - Gives some flexibility
- Yes - Gives you flexibility of precip type, temp, precip rate, jet blast
- Yes - Good procedure guideline I like the holdover time concept
- Yes - HOT often expire at gate at ORD any max. limit would curtail ops to standstill

- Yes - Have light and moderate need HEAVY
- Yes - Have to be able to adjust times for conditions or give a single value for more types of conditions
- Yes - Heavy snow less than 1/2 miles visibility
- Yes - Here again during heavy precip I always check the wings so the range are only a guideline
- Yes - However it gives the FAA a way to hang you if they went to
- Yes - However, the RATE of precipitation which is falling is not always easy to judge & makes you wonder how accurate the range of holdover time really is in helping to determine fluid effectiveness
- Yes - I always figure worst case scenario
- Yes - I always use lower end when dealing with freezing drizzle, ice pellets, etc.
- Yes - I still have the wing inspected just before T/O
- Yes - I think that rate of precipitation effects holdover time
- Yes - I use the range for intensity and consistency of precip
- Yes - I usually use the shorter time as a conservative guide
- Yes - Ice pellets should have their own line/data in table
- Yes - Icing conditions are variable, a range is more realistic (obviously not an idea created by FAA)
- Yes - If comments include how to apply and interpret the range
- Yes - Implies that it is an estimate, not hard fact
- Yes - Important to allow for various degrees of precip
- Yes - Impossible to have specific value
- Yes - Instills that it varies based on conditions
- Yes - It allows for judgment as to existing specific conditions
- Yes - It allows for my own judgment & WX evaluation
- Yes - It allows for various precipitation intensities
- Yes - It allows me to account for variables like wind direction & speed
- Yes - It demonstrates the variation in holdover time and .. need for visual checks
- Yes - It gives an envelope of time
- Yes - It has to vary with precip rate/temp
- Yes - It is only a guide
- Yes - It is still a problem determining what type (heavy or mod) precip is falling, but the chart with ranges do help with "ballpark" figures
- Yes - It provides more flexible interpretation
- Yes - It recognizes the subjective nature of the whole issue
- Yes - It's a reminding there are no absolute
- Yes - It's a wag based on your current conditions
- Yes - It's all still very subjective
- Yes - It's fine
- Yes - Judgment as an experienced pilot
- Yes - Judgment based on 39 years experience
- Yes - Judgment is necessary based on precipitation intensity
- Yes - Judgments can then be made based on precip rate & consistent
- Yes - Kinda says after this time (first one) fluid failure may occur esp. if conditions worsen
- Yes - Leaves it open for pilot; judgment
- Yes - Leaves room for pilot judgment
- Yes - Legality
- Yes - Let pilots use their own judgment
- Yes - Lower range for moderate precip & upper for light
- Yes - May be too flexible
- Yes - More flexibility for different conditions
- Yes - More flexible
- Yes - More latitude in interpreting present conditions
- Yes - More reasonable
- Yes - More relevant
- Yes - Most often pushing maximum value for HOT, but the range is very informative as to beginning time limit of fluid failure
- Yes - Must have a range due to different precip rates
- Yes - Need some flexibility
- Yes - Need some flexibility
- Yes - Needs to be definitions for ex: heavy snow, lt. snow, etc.
- Yes - Nice to have due to the wide range of precipitation rates, and conditions
- Yes - No one situation is ever the same
- Yes - No one value covers all situations
- Yes - Offers interpretation/judgment
- Yes - One time can not cover all conditions
- Yes - Only if they can extend
- Yes - Our tables are not that specific i.e. what is light snow versus moderately light snow
- Yes - Pilots are the best at deciding current WX conditions
- Yes - Precip intensity varies so different numbers can be used
- Yes - Precip type can vary within time allowed
- Yes - Precip varies - HOT range is useful
- Yes - Precip. is variable
- Yes - Precip. rate is the subjective part
- Yes - Precip. rate vary greatly
- Yes - Range = judgment
- Yes - Range allows for variation in precip intensities, i.e. showers
- Yes - Range because of varying rates of precipitation and temperatures
- Yes - Range emphasizes, it's not precise
- Yes - Range is good because conditions vary so much
- Yes - Ranges are more realistic than single values
- Yes - Reinforces the uniqueness of each situation
- Yes - Single doesn't match or watch? change WX
- Yes - Single value is not operationally realistic
- Yes - Single value too restrictive
- Yes - Situations not always cut and dry
- Yes - Snow intensity based on visibility is ridiculous! NEVER see more than "light snow"
- Yes - Snowflakes vary widely in size, tables don't get quite that specific
- Yes - Some HOT are so short that they expire before deicing is complete. These times were obviously exceeded for ALL of the years of operating experience before HOT were published with the ranges
- Yes - Table could be easier to decipher/understand quickly!
- Yes - Temp/time + precip type
- Yes - That call can't be made from an easy chair
- Yes - The "range" info seems to reinforce awareness that HOT is only ONE facet of the decision which still lies with the crew
- Yes - The holdover tables are fine

- Yes - The range allows for variations in precip rate & other variable factors
- Yes - The table is a way for the Engineers to CYA and the FAA to bust pilots if something goes wrong
- Yes - There are a lot of variables
- Yes - There is not exact number
- Yes - This helps with the variation of the rate of precipitation
- Yes - Times depend on precip
- Yes - Too many people automatically use the maximum figure
- Yes - Too many variables
- Yes - Too many variables for single value (**X 2 responses**)
- Yes - Variable conditions
- Yes - Variables
- Yes - Varies on the precipitation rate from one person to another
- Yes - Varies with intensity of precipitation
- Yes - Varying conditions latitude allowed
- Yes - Very hard to figure
- Yes - WX conditions change rapidly
- Yes - We have them - they allow us to take on timing
- Yes - We shouldn't be held to a single value. There **MUST** be flexibility for determining safety
- Yes - Weather can never be categorized into a single value
- Yes - Weather conditions can vary
- Yes - Weather conditions vary
- Yes - Weather frequently changes during holdover
- Yes - When combined with ability or inability to visually inspect (dirty window)
- Yes - Winter WX are seldom constant, and a range is very useful during changing conditions
- Yes - With experienced crew discretion is more useful
- Yes - With types II & IV we are usually airborne for before the HOT expires
- Yes - With very light precip - you can go longer WX conditions are different, therefore A RANGE
- Yes - Without side temp & rates of precip I then err on the conservative side
- Yes - Yes - conditions vary too much to use a single value
- Yes - Yes, because conditions vary so much, no because if I were to do everything "by the book" and crash I'm still liable
- Yes - Yes, but I lean toward shorter more conservative times
- Yes - Yes, due to intensity of precip & size (mass) of precip
- Yes - Yes, for precip rate
- Yes - You almost have to use a range for varying rates precipitation
- Yes - You can adjust based on conditions
- Yes - You cannot legislate common sense
- Yes - You need some flexibility
- Yes - You're dealing with many VARIABLES
- No - A conservative single value would be safer
- No - A formula to determine exact position within the range would be helpful. Based on temperature perhaps?
- No - A hard fast number is easier to work with.
- No - A hard number is simpler to apply
- No - A minimum number is not as useful as a maximum number
- No - A range acknowledges what we all know: HOTs are wags, not engineering F's, and useless except to lawyer or FAA
- No - A range of times is useless. A specific time (conservative) gives the crew a target after which specific steps **MUST** be taken without question
- No - A range opens up interpretation issues
- No - A single time would be less confusing or more definitive
- No - A single value gives a better educated value
- No - After min. time I rely on visual insp.
- No - Again very subjective to precip rate, time and visual
- No - Again-I've seen guys split the ranges, then ignore them when time is up or say it's really the next range or they (deicers) gave us improper HOT-all to avoid the dreaded return to gate
- No - Allows people to say we are in the range & forego re-deice
- No - Always use lowest value
- No - Always use the maximum
- No - Always use worst case
- No - Ambiguous
- No - Be more specific on a precipitation rate and give a number for heavy, MOD, & poor
- No - Because of precip rate variables
- No - Both are political, not practical
- No - Cannot quantify heavy or light
- No - Company always pushes the limits
- No - Each situation is different; too many variables. I just check regardless of HOT
- No - Easier to base a re-deicing decision based on a finite number ratio than subjective interpretation
- No - Everyone uses either the lower or higher number as a limit anyway
- No - Everyone's judgment is different - Pilots usually choose the longest possible HOT
- No - Garbage
- No - Gives the impression of inaccuracy leading to Captain's stretching this
- No - Giving a range would adversely affect safety since now you have another subjective variable to deal with giving a clean-cut single value makes process more objective & safer
- No - Giving us rope to hang ourselves. Make it one value
- No - HOT chart provides my evaluation of con. - if accident/incident happened my evals would be discredited, rather use FAA WX evals & hard #
- No - Holdover time has always elapsed if icing conditions exist (usually before they are finished deicing)
- No - Holdover times are guides only - mean little either the a/c is clean or it is not
- No - I hold little faith in these charts. A visual check is the only method I trust
- No - I look at the shortest time
- No - I use the minimum time
- No - I use the most conservative number
- No - I want a single value
- No - I would prefer one number that is more or less the minimum effective time

- No - I would still have to re-deice if lower number of range was reached
- No - I'd rather see a conservative minimum value. A range is subject to too much interpolation
- No - If it is over the MINIMUM time, you have to do a more extensive pre-takeoff check anyway
- No - If time exceeds the minimum of the range - I consider HOT expired
- No - Impossible to quantify every condition
- No - Intensities are very subjective
- No - Invariably we fall on the high end of the range
- No - It always comes down to the maximum value of the holdover time due to ATC delays
- No - It's a guideline anyway
- No - It's only a starting point. A guess at best. My interpretation of precip rate and yours are entirely different
- No - Judgment calls are very difficult unless you can see the wings very well
- No - Just give me max. time
- No - Leaves it too open for personal interpretation which may differ for similar conditions
- No - Lower time becomes meaningless
- No - Make it a procedural time not a technique
- No - Make it less subjective
- No - Maximum # of a range becomes a single value
- No - More math
- No - No guidance for strength of precipitation - my light snow might be someone else's moderate
- No - Normally use maximum
- No - Once again it's Russian roulette
- No - Our tables give single values
- No - Ours don't use a range
- No - Ours give a specific time for specific conditions
- No - Prefer a conservative value
- No - Prefer hard times, less questioning that way
- No - Prefer specific maximum time limit
- No - Range allows us to adjust for conditions
- No - Range is too subjective
- No - Should give most restrictive value
- No - Should be set time with safety factor added
- No - Single value for worst condition is better
- No - Single value indicating worst case most beneficial
- No - Single value is clearer/concrete
- No - Single value is considered a minimum time
- No - Still with I number
- No - Subjective to interpretation
- No - Tend to shy towards shortest because I don't know variables
- No - The G..... is down or it ain't
- No - The most pessimistic value is the only one I care about
- No - The numbers are merely a legality thing to me
- No - The range is too open for interpretation
- No - The range looks like FAA C.Y.A. so they can hammer us under almost any scenario. If they know the time, say so, If they don't, say that too
- No - The table should use the most conservative (shortest) time and leave it at that
- No - The whole thing is guidance only so many factors might/will effect the time
- No - There are too many factors that affect actual HOT that the tables are worthless
- No - These numbers are merely a GUIDE
- No - They are just covering liability
- No - They lead to gross interpretation errors. The most advantages times will usually be relied upon
- No - This is an inexact science, and a range may be warranted/useful. First impression still no
- No - To range may fail, may not - Who knows - we don't
- No - To use any value other than lowest time hints at negligence!
- No - Too many things going on in cockpit (trying to figure out different charts/ranges adds to workload)
- No - Too many variables for a range. Sometimes the time range is quite large
- No - Too much leeway
- No - Too subjective
- No - Type of precip. is usually unique
- No - Upper limit would suffice
- No - Using the upper end of the range is really not an option if you want to CYA
- No - Very hard to determine the proper range
- No - Very subjective
- No - Visual check is the only thing
- No - We have a single value, no range
- No - We need some black & white for decision-making
- No - We typically use the of the range anyway
- No - We use (supposedly) the low number anyway
- No - Weather conditions on table aren't that specific.
When does light snow change to moderate snow (how many flakes per minute)
- No - Well a range is better for practical reasons, but for legal reasons I would rather have a hard number with the discretion to re-deice if the crew feels it's necessary
- No - What I'm working for is MAX HOT
- No - What grounds for interpretation?
- No - Will always use the upper end. Holdover times are not regulatory, anyway
- Inv. resp. - HOT's are a bad joke!
- Inv. resp. - Holdover time seem unrealistic
- Inv. resp. - Holdover times are a joke?
- Inv. resp. - I believe we operate with a set number of minutes for various conditions-if we can get off within them, we go. If not, hopefully we'll deice
- Inv. resp. - Mixed on this
- Inv. resp. - No opinion
- Inv. resp. - No range given, just a time
- Inv. resp. - Our tables are specific. However, definitions of light, moderate, and heavy are somewhat vague
- Inv. resp. - Unsure

D4. How confident are you that the aircraft is clean when cleared by the ground deicing crew?



How confident aircraft is clean when cleared by the deicer crew?

[Invalid responses: 34 (2%)]

Comments:

Very confident - 2 years ago at SDF, after ground personnel had reported "clear of all contaminants" prior to taxiing, takeoff canceled due to dest. airport closed due to snow. At gate notice ice on rt/lft wings

Very confident - Airline has improved greatly over last 2-3 winters. Training has been given more emphasis and deicing crews are more qualified as a result of this.

Very confident - All the deice crews I have worked with are very conscientious

Very confident - As long as they're doing what the "book" tells them

Very confident - As long as using our company trained crews

Very confident - As long as we use company deicers

Very confident - At company operated stations only

Very confident - At hubs, fairly confident away

Very confident - At large hubs, smaller stations - it depends on the people - do they follow procedure etc. - if not it casts a little more doubt

Very confident - At major stations

Very confident - At most airports

Very confident - At my carrier, ramp people are assigned deicing but the mechs also OK prior release

Very confident - At our airline everyone errors on the side of safety

Very confident - At our own bases-done by our own people

Very confident - At that moment it is

Very confident - At the airports I operate from, the crews do a good job

Very confident - At the gate don't know after taxi, but you have to trust someone, I think?

Very confident - Based on company standards/training

Very confident - Based on deicing jobs in past

Very confident - Best case scenario usually

Very confident - Best view, trained in deice procedures

Very confident - But depends on "WHO" & where

Very confident - But only for a short time during times of heavy precip

Very confident - But, if we are at the gate, I require a visual inspection from flight crew

Very confident - Carrier is diligent re deicing

Very confident - Company crews at winter stations

Very confident - Company procedures are very good

Very confident - Dealing with trained professionals at my airline who take a pride in their job

Very confident - Deicing crews are very well trained and competent

Very confident - Deicing crews seem to know the severity of their job on our safety of flight

Very confident - Depends on airport and who provides service

Very confident - Depends on location (airport) in company or other airline. Very if contractor varies

Very confident - Do a fine job - but long way/time from ramp out to runway

Very confident - Do a good job?

Very confident - Especially at our hub stations

Very confident - Especially, if by company personnel - less confident of contract personnel at outstation

Very confident - Everywhere but DIA

Very confident - Excellent ground support have had to cancel when deice crew said they couldn't keep up with it

Very confident - Except HPN

Very confident - Except contract personnel

Very confident - Exception is freezing rain

Very confident - Fluid is liberally applied

Very confident - From watching the deicing of other a/c I feel our crews are very thorough

Very confident - From what I have observed at our company deicing crews do a very thorough job with fluid application

Very confident - Good company coordination procedures

Very confident - Ground crew are generally excellent

Very confident - Have lot of confidence in our company deicing personnel. Small, outlying stations with non-company personnel, allowances have to be made-confidence level drops considerably with small independent contract

Very confident - High pressure wash will clean an aircraft that has not set for 8 hours in freezing rain every time

Very confident - I ALWAYS double check.. and they've never been wrong!

Very confident - I am very confident when I leave the pad. I would not depart unless I was 100% sure of a clean a/c

Very confident - I ask questions about specific areas

Very confident - I believe at our company we deice many times when it is not necessary

Very confident - I believe the ground deicing crews have been trained well these last few years. They are much more aware of problems with deicing. There is a new focus on this problem

Very confident - I believe the importance of de/anti-icing has been conveyed to ground crews

Very confident - I check

Very confident - I feel the deicing crews are very well trained

- Very confident - I have never doubted their experience or ability to deice
- Very confident - I trust UAL personnel doing the work
- Very confident - I trust the ground crew just as much as I trust ATC
- Very confident - I've only heard of one incident where the a/c was NOT thoroughly cleaned. Wasn't even one of ours
- Very confident - I've watched many times. They really clean good
- Very confident - If done by company personnel
- Very confident - If done by company trained personnel
- Very confident - In major hubs very confident @ outstations fairly confident
- Very confident - In most cases
- Very confident - It depends on deicer - I watch
- Very confident - It doesn't take a lot a talent to deice a plane
- Very confident - It usually seems to me that they've taking too long and using too much fluid! They use cherry-pickers so they can see top of tail-we can't (and fuselage)
- Very confident - It's usually the other way around-neither my F/O or I can find any contamination on preflight, but the deice crew can
- Very confident - More confident when using my own company people
- Very confident - More so with company personnel rather than outstation contract
- Very confident - Most of the time more is sprayed than needed
- Very confident - My airline does an exceptional job in training ground deice crew & provides deicing at all airports we operate to. (No outsourcing with unknown vendors)
- Very confident - My airline has a first rate deicing program and well trained crews
- Very confident - NWA does a great deicing job particularly in the hub stations
- Very confident - NWA is very careful
- Very confident - Newer, better equipment & training
- Very confident - No need for visual check
- Very confident - Nothing replaces a visual, tactile, check by a well-trained human being
- Very confident - Once again - Remote is top on my list
- Very confident - Once again, I am suspect of contract vendors. Some to the point of visually checking their work before we depart the gate
- Very confident - Our MX does deicing. As I understand it their training is extensive & taken seriously. We are seldom deiced by anyone other than company
- Very confident - Our airline deices clean wings as well as contaminated wings, so they all resemble the clean wings in order to pass!
- Very confident - Our company deicing personnel are trained very thoroughly and it shows
- Very confident - Our company does
- Very confident - Our company does an excellent job
- Very confident - Our crew are excellent at that job and are very competent and consciences
- Very confident - Our crews are well trained and do a good job
- Very confident - Our crews deal with this every season, they are seasoned airline veterans and know their jobs well
- Very confident - Our crews do a very good job
- Very confident - Our deicing crews do a great job - notifying us of the need for deicing and also getting the timing right so we're not delayed - yet not wasting HOT
- Very confident - Our ground crews are very competent
- Very confident - Our ground crews seem even more cautious than we are
- Very confident - Our ground crews seem well trained, professional and committed to doing a good job
- Very confident - Our ground deicers are very well trained and perform lots of actual deicing events
- Very confident - Our own airline people do it, so we have know quantity
- Very confident - Our people tend to overkill deicing/anti-icing. If they say it's clean, it's clean
- Very confident - Overall, our company deicing crews do a very good job
- Very confident - Particularly at our company hubs
- Very confident - STL crews are very good
- Very confident - Since I operate often in the "winter" environment, the crews at my airline are very competent
- Very confident - That doesn't mean for T/O - because deicing should be done at the end of runway before T/O
- Very confident - The deice job at OUR company - run operations is first-class
- Very confident - The ground people are very well trained, however if precip is falling the cockpit crew check also!
- Very confident - They always seem professional & knowledgeable
- Very confident - They are (ground crews) good at what they do
- Very confident - They are highly trained and know the responsibility they have
- Very confident - They are trained and know what to look for.
- Very confident - They are trained for this procedure
- Very confident - They are usually very conservative
- Very confident - They are well trained, and typically over-cautious
- Very confident - They do a good job
- Very confident - They do an excellent job
- Very confident - They don't want to be responsible if something happens. If anything they exceed what is necessary. That's good!
- Very confident - They have been trained well and act very professionally
- Very confident - They touch the wing surface
- Very confident - They are well trained. I watch them while I wait in line. I am impressed with their professionalism
- Very confident - This is based on numerous observations of other a/c undergoing deicing. The crews I've seen are

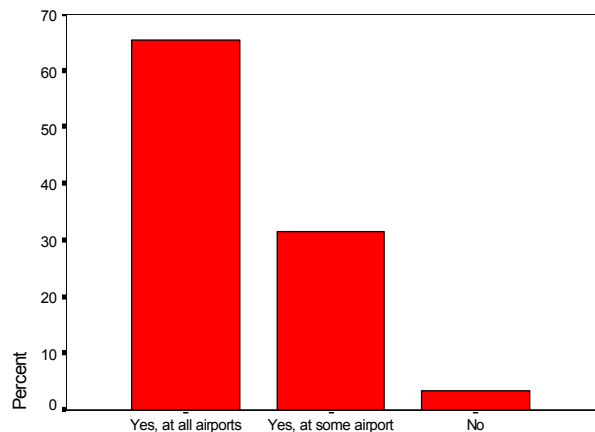
- extremely thorough and normally "spare no fluid" in ensuring the a/c are clean
- Very confident - Training and professionalism of ground crews much improved in recent years
- Very confident - Training is better
- Very confident - Training of the folks that do the deicing seems much improved in the last few years
- Very confident - Trust their signature in on the paper work
- Very confident - Usually, folks that do this job regularly do it very well
- Very confident - We can't start second guessing our equipment, ground crew..
- Very confident - We have thorough de/anti-icing proc.
- Very confident - We now have dedicated deicing crews. It's their full-time winter job!
- Very confident - We tend to use an excess amount of fluid!
- Very confident - Well trained ground crews
- Very confident - Well trained personnel evaluating from the outside is the best method I know
- Very confident - When at MWA station
- Very confident - When done by company personnel - NOT contract
- Very confident - Would not takeoff if there was a doubt as to the aircraft being "clean" or not
- Very confident - You have to trust them that they have been trained and are aware of the importance of their job
- Very confident - You have to trust your co-workers or system breaks down
- Fairly confident - After deicing
- Fairly confident - Again personal contact with crew to assess their competency is preferred
- Fairly confident - Again some stations are better than others
- Fairly confident - Always have a doubt due to different personnel is attitudes, training, background & level of responsibility. Also-they're not going flying
- Fairly confident - At hubs, ground crews are reluctant to deice in marginal conditions because entire will then want to deice. This encourages MX to under-react in marginal conditions, which is unsafe. We should deice thoroughly
- Fairly confident - At most stations
- Fairly confident - But still like to check myself because of not knowing what type of deice crew we may be using in a particular airport
- Fairly confident - Can't see tail from ground in ATR
- Fairly confident - Communication could be better, especially away from the hub
- Fairly confident - Concerned of the high turnover rate at some stations, and therefore their experience
- Fairly confident - Confidence drops when outside the US in Asia
- Fairly confident - Constantly new personnel conducting deicing
- Fairly confident - Deicing not always done properly
- Fairly confident - Depending on station where deiced
- Fairly confident - Depending on where aircraft was deiced in North America
- Fairly confident - Depends on airport
- Fairly confident - Depends on airport and ground personnel
- Fairly confident - Depends on airport; and then mainly on equipment or procedures utilized
- Fairly confident - Depends on crew who is deicing
- Fairly confident - Depends on past experience with that station & quality of equipment
- Fairly confident - Depends on station
- Fairly confident - Depends on the airport
- Fairly confident - Depends on the confidence I have in the crew (deicing crew) and their equipment to do the job, type fluid, etc.
- Fairly confident - Depends on the crew
- Fairly confident - Depends on the station
- Fairly confident - Depends on the station & its personnel. Some are more reliable than others
- Fairly confident - Depends on the station and its general climate
- Fairly confident - Depends on where I am. Some places I'm 100% confident, at others I'm not sure they know what "clean" means
- Fairly confident - Depends on whether co. or contract people do it. Have some doubts at HPN, for example.. they do all airlines, and have high turnover
- Fairly confident - Depends on whether deice was done by company or contract & how PROFESSIONAL these ops seemed
- Fairly confident - Depends on which station; some are excellent, others questionable
- Fairly confident - Depends on who does the deicing
- Fairly confident - Depends on who's doing the cleaning
- Fairly confident - Depends on who's doing the deicing - some crews seem better trained
- Fairly confident - Depends where I'm deiced
- Fairly confident - Depends who cleaned the wing
- Fairly confident - Difficult for them to see top of wings from ramp
- Fairly confident - Depends on location
- Fairly confident - Engine nacelles are biggest problem. They don't like firing a lot of fluid in there
- Fairly confident - Except for rime ice on arrival and removing ice from unheated surfaces
- Fairly confident - Except in JFK
- Fairly confident - Fairly confident = at the hub when done by our A&Ds. Not confident = at outstations when done by poorly trained & poorly equipped personnel whose only focus is to dispatch a/c out of the gate!
- Fairly confident - Full-time deicers do the best job. It's the places where the people have to load bags, then they become deice crews, I have doubts about. They are tired, and just want to get back inside!
- Fairly confident - Gotta trust someone - I ask specific questions
- Fairly confident - Had to bring a deice truck when the prop blades were missed. I do feel most ground crews do a very good job with the deice process, however, some times they hurry and occasionally miss a spot or two
- Fairly confident - Hard time trusting \$5.00/hr help that has no real concept of ice and how it affects a/c performance
- Fairly confident - Have had entire wing (1 side of aircraft) missed - not deiced - had to taxi back to re-deice

- Fairly confident - Hubs .. very confident. Outstations that don't often get icing conditions .. Little or none
- Fairly confident - I always check the tail myself
- Fairly confident - I had heard an a/c was deiced (only one wing)
- Fairly confident - I have been told once that a/c was clean and found that the wing still had 4" snow on the outboard. part of wing
- Fairly confident - I hope they would error on conservative site
- Fairly confident - I observed them failing to deice the empennage of one of our other a/c. Called the crew on Co. Freq. & they required another deice. We're @ their mercy in large a/c
- Fairly confident - I think asking deicing crews what some of the factors could be that would influence their quality of work how long have they been out in the blowing cold, freezing precip. etc.
- Fairly confident - I try to talk to deice crew at outstations. I will question any concern that I have concerning deicing. If doubt still present-will request to be deiced again-Haven't had to do this for 2-3 years
- Fairly confident - I usually confirm primary control surfaces
- Fairly confident - I watch while they do & walkaround when they are done. I won't always have that option
- Fairly confident - I wish I could see
- Fairly confident - I would be more confident if I knew about their training
- Fairly confident - I would prefer a "mechanic" as final authority when doing post-deice check
- Fairly confident - I'd like to know more about those qualifications, training, and *go-nogo* criteria
- Fairly confident - I'm less confident when using contract personnel or non-mechanic ramp personnel than using company/FAA certified mechanics
- Fairly confident - I'm most concerned about the tope of the horizontal stabilizer
- Fairly confident - I'm not sure they know how important it is for the a/c to be COMPLETELY clean before takeoff
- Fairly confident - I've had crews tell me the plane is clean, but I can see ice on the props. Also, ground personnel turnover keeps deicing crews relatively inexperienced, don't understand importance of deicing (tail)
- Fairly confident - I've never been disappointed by a deicing crew
- Fairly confident - I've only had 1 problem that I know of
- Fairly confident - In future maybe not because a/c cleaners are being trained for deice duty taking that job away from mechanics
- Fairly confident - In the regional airlines I did it myself because of poor training at certain stations
- Fairly confident - It depends on what station I am getting deiced. At some stations I wonder if they even sprayed
- Fairly confident - Mistakes happen
- Fairly confident - More confident @ hubs than outstation
- Fairly confident - More confident at station that do it more often
- Fairly confident - Most deicing is done by mechanics
- Fairly confident - Most outstations are not reliable
- Fairly confident - Much more confident if deicing fluid is being used "liberally" i.e. crew sprays fuselage & lots of fluid is running down windows. Much less confident if crew seems to sparingly spray only selected areas
- Fairly confident - My biggest problem with ground crews is that they want to use Type I in ALL conditions. More training is required
- Fairly confident - Need full-time dedicated personnel whose only job is to deice
- Fairly confident - Never as confident as when I check
- Fairly confident - Not overly confident in a 20 year old's ability to make that decision after a night of partying and pressure to move on to other a/c
- Fairly confident - Not sure of their training, do they understand the effects of a poorly deiced wing or do they think it's good enough
- Fairly confident - Not sure they check top of wing or especially tail surfaces
- Fairly confident - Not sure what their training entails. Had a few bad judgments made by ground crews
- Fairly confident - Occasionally I'll see a/c lined up for T/O with snow on top of fuselage (wing engined aircraft).Although this is not a major concern, our handbook clearly states all surfaces must be deiced, incl. fuselage
- Fairly confident - Often ground crews fail to follow prescribed deicing sequence and are required to start program. This doesn't exactly inspire confidence
- Fairly confident - One can only ponder the individuals integrity
- Fairly confident - Our company has a history of deicing crews not deicing the tail surfaces leading to after takeoff fun for the flight crew
- Fairly confident - Our ground deicing crew consists of our already overworked low paid mechanics. They try their best but...
- Fairly confident - Poorly trained deicers is a real problem
- Fairly confident - Pressure for on-time departure makes often very difficult to stick with the right DECISION
- Fairly confident - Quality of ground deicing crews vary
- Fairly confident - Some moron's out there
- Fairly confident - Some outstations, I feel don't show the importance of deicing
- Fairly confident - Some personnel don't really care
- Fairly confident - Sometimes personnel don't fully grasp the clean aircraft concept - training seem only fair especially at out stations
- Fairly confident - Sometimes they are in a hurry
- Fairly confident - The statement that "the aircraft is clean" has become mechanical and most ground personnel do not seem to truly understand what conditions must be met to give that statement
- Fairly confident - The tail surface is always a concern when flying T-Tail aircraft
- Fairly confident - They are getting better at it
- Fairly confident - They are human - working in miserable conditions
- Fairly confident - They are not perfect
- Fairly confident - They need better training

Fairly confident - They're low paid & under-trained
 Fairly confident - They're only human
 Fairly confident - This is entirely dependent on the station & people
 Fairly confident - This year our DC-10's & 57's have taken off with ice on fuselage. 4 separate occasions. Confident level now lower
 Fairly confident - Unsure of fluid ratio/temp. with now airline contract deicing. Remember those guys are the low bidders
 Fairly confident - Variation in fluids and deicing crews
 Fairly confident - Varies widely with different deice crews
 Fairly confident - Very confident at hub stations. Less confident elsewhere
 Fairly confident - Very confident when performed by my company - not so confident when a contractor does the job
 Fairly confident - Very confident with my own company trained people. Not AS confident with rent-a-deicers except at Paris Charles de Gaule
 Fairly confident - We have good training and dedicated employees
 Fairly confident - We're not usually able to verify how well the aircraft has been deiced. We deice with
 Fairly confident - We're putting a lot of trust in people who may or may not realize the extent of their responsibility. Must seem to be conscientious in their mannerisms & reports
 Fairly confident - When "snowman" is on duty
 Fairly confident - Where? USA or foreign?
 Fairly confident - Would appreciate the sensors!
 Fairly confident - Would rather see it myself or have another pilot check
 Fairly confident - You can't verify what you can see
 Not confident - Deicers are short staffed & not qualified
 Not confident - Depending at what station e.g.: ORD very confident but at other stations e.g. Vancouver: not confident at all
 Not confident - Depends on who's doing the deicing!
 Not confident - Have been told aircraft was "clean" and there was still ice on critical areas
 Not confident - I always send the F/O out to visually check. Deicing personnel are very poorly trained
 Not confident - I check both because there is such a wide variety of quality among ground deicing people
 Not confident - I feel ground crews do not have a FULL understanding of the consequences of ice buildup. Weather conditions are usually inclement and they just want to get it over with so they can get back inside!
 Not confident - I have found frost top of wing when (Ground crew says no contamination on wing) more than once
 Not confident - I have heard more than one story of passengers pointing out ice/snow left on leading/trailing edges of aircraft at on-gate deicing stations
 Not confident - I never take anybody's word on the status of my a/c. Especially at my company

Not confident - I've ordered the aircraft re-deiced THREE times before proceeding on one occasion and now require a tactile check
 Not confident - It depends on where we are and who did it
 Not confident - Low paid, uneducated ground crew
 Not confident - Most times I have checked and found ice after they deice at the outstations
 Not confident - Must be verified by crew!
 Not confident - Not sure that they know what cont. fluid would look like
 Not confident - Poor ground crew training, station more concerned with cold weather & on-time. Lack of good equipment
 Not confident - These guy make minimum wage
 Inv. resp. - Our own personnel usually supervise the operation

D5. At each airport, are you informed of the type of fluid in use for deicing and anti-icing without specifically asking?



Are you informed of the type of fluid without specifically asking?

[Invalid responses: 33 (2%)]

Comments:

Yes at all airports - Again - this is in-house company procedures
 Yes at all airports - Again I feel our deicing crews have done a good job of communicating type of fluid used
 Yes at all airports - Again, we are almost always deiced by company personnel
 Yes at all airports - Airline does a good job of this
 Yes at all airports - All airports where I have de-iced recently
 Yes at all airports - Almost 100% of the time
 Yes at all airports - Almost always
 Yes at all airports - Also informed of mix & start/completion time
 Yes at all airports - And time last step was started

- Yes at all airports - At company deicing locations this info is provided. Less standardization outside of my company
- Yes at all airports - At company supported contract services
- Yes at all airports - But only after deice complete unless you ask
- Yes at all airports - Company does ours
- Yes at all airports - Company operating procedure
- Yes at all airports - Company policy (**X 4 responses**)
- Yes at all airports - Company policy/have not been deiced by another than company personnel
- Yes at all airports - Company procedure (**X 7 responses**)
- Yes at all airports - Company procedures require a post-deice report including type of fluid
- Yes at all airports - Company procedures require deice crew to inform cockpit
- Yes at all airports - Company requirement (**X 5 responses**)
- Yes at all airports - Crews are usually good at this
- Yes at all airports - Deicing is done by company ramp agents with company owned fluid
- Yes at all airports - HOT varies for different "brands" of Type IV fluid; the brand supplied is not always known by deice control
- Yes at all airports - Hubs that I have deiced at with company deicers
- Yes at all airports - I can usually request my choice if necessary
- Yes at all airports - I demand it if not provided
- Yes at all airports - If not I ask for it
- Yes at all airports - If not informed I ask, they usually just forget to tell you
- Yes at all airports - If they forget, I ask
- Yes at all airports - It is company procedure
- Yes at all airports - It is regulation
- Yes at all airports - It would be nice to know what is applied before the start of deice
- Yes at all airports - It's a procedure
- Yes at all airports - It's our proc to get this info
- Yes at all airports - Mandatory
- Yes at all airports - Most non-hubs only have Type I so sometimes it's assumed Type I
- Yes at all airports - Most of the time
- Yes at all airports - Most of the time, occasionally have to request Type II or IV
- Yes at all airports - My airline seems well standardized on info REQUIRED to be given to cockpit crew
- Yes at all airports - Nearly all
- Yes at all airports - Normally
- Yes at all airports - Not all airports tell the mixture of glycol to water for Type I
- Yes at all airports - Occasional lapses but very rare
- Yes at all airports - Occasionally we have to ask the deicer for info
- Yes at all airports - Once or twice I had to ask
- Yes at all airports - Only if ground deicing procedures are in effect
- Yes at all airports - Only operated with deice at 1 airport in North America
- Yes at all airports - Only when ground icing program in effect
- Yes at all airports - Or I ask
- Yes at all airports - Our airline's procedures
- Yes at all airports - Our procedures require it (**X 2 responses**)
- Yes at all airports - Part of company procedures
- Yes at all airports - Part of procedures
- Yes at all airports - Pilots should be asked before hand what type they want
- Yes at all airports - Procedures
- Yes at all airports - Procedures require it
- Yes at all airports - Really most airports, probably personnel forget to tell
- Yes at all airports - Required
- Yes at all airports - SOP (**X 3 responses**)
- Yes at all airports - SOP - ask if not given
- Yes at all airports - The type of fluid available is listed in company airport directory
- Yes at all airports - This is company policy
- Yes at all airports - This is company procedure
- Yes at all airports - United is very specific on our reporting procedures
- Yes at all airports - Unless done for AM departures and no subsequent precipitation
- Yes at all airports - We are a commuter
- Yes at all airports - We ask if not stated
- Yes at all airports - We need to make a standard between countries especially US and Canada
- Yes at all airports - We usually know ahead of time, for planning
- Yes at all airports - What gets me is using Type I during a freezing precip. vent often the fluid is the same temp as O.HIT (not hot) then I do the walk around after deicing
- Yes at some airports - 95% comply
- Yes at some airports - A few don't unless asked
- Yes at some airports - A few outstations have contract deicers and sometimes they have to be asked
- Yes at some airports - Airport away from hubs are most lax in duties
- Yes at some airports - All company personnel. We sometimes have to ask (10%)
- Yes at some airports - Almost always
- Yes at some airports - Almost always if there is current precip falling
- Yes at some airports - Always at hub. Most times at outstations
- Yes at some airports - Always, when deiced by our own people, Have had to ask some other providers
- Yes at some airports - And request it when not offered
- Yes at some airports - As might be expected, company on other major OAL does good work, brand "x" airport services is marginally competent at best
- Yes at some airports - At company operated stations
- Yes at some airports - At most airports (**X 3 responses**)
- Yes at some airports - At most stations - but not all
- Yes at some airports - At non-hubs, we usually must ask
- Yes at some airports - At smaller stations must ask typeII/IV. Has been my experience small stations Type II/IV deice units seem to fail (clog-up, fluid congeals?) Have many occasions not got Type II/IV (crew inability) to spray

- Yes at some airports - At some small stations they don't always give me all the info so I have to ask
- Yes at some airports - Both: 1) anti-icing, always. 2) Deicing (frost), sometimes
- Yes at some airports - But this is rare in my experience
- Yes at some airports - Company emphasis on training crews would help
- Yes at some airports - Company procedure
- Yes at some airports - Depends - WHO & WHERE??
- Yes at some airports - Do not always receive this info without asking
- Yes at some airports - Don't always get brand of Type IV used
- Yes at some airports - Even though our company has specific written procedures - deicing crews don't always provide required info
- Yes at some airports - Everyone is supposed to give the info automatically-most do-some don't & then we ask
- Yes at some airports - Generally, contract personnel are the worst
- Yes at some airports - Had to ask for them in BWI
- Yes at some airports - Had to ask once or twice this winter
- Yes at some airports - Happens most of the time
- Yes at some airports - Have to ask some times - usually at small stations
- Yes at some airports - Have to often ask for Type IV brand
- Yes at some airports - Hubs are better than smaller stations. Usually have to ASK at smaller stations
- Yes at some airports - I always request Type II ratio if not told
- Yes at some airports - I find this to be a big problem
- Yes at some airports - I frequently must ask - not really a problem
- Yes at some airports - I wish they ALL would ask us first which type we want
- Yes at some airports - I've been deiced & never talked to the crew
- Yes at some airports - If I ask, I am always told
- Yes at some airports - If the don't, it's because they're busy & sometimes you get the routine a little out of synch. Usually it's "Oh yeah, type fluid."
- Yes at some airports - If there is any question they ask the Captain
- Yes at some airports - In rare occasions you have to ask (they forget) maybe only 5% of time that happens at some outstations (small airports)
- Yes at some airports - It is always available if you ask.
- Yes at some airports - Lack of consistent procedures
- Yes at some airports - Less than 50%
- Yes at some airports - MSP worse than others combined
- Yes at some airports - May need to request this info
- Yes at some airports - More crew specific than airport specific
- Yes at some airports - More now than before - getting better
- Yes at some airports - Most [airports] (**X 4 responses**)
- Yes at some airports - Most airport very good
- Yes at some airports - Most airports - part time help is worst
- Yes at some airports - Most airports are very good about this
- Yes at some airports - Most airports, unless deiced prior to crew arrival
- Yes at some airports - Most are professional. Rarely you get new person
- Yes at some airports - Most contract and some company don't know without checking with someone else
- Yes at some airports - Most if not all
- Yes at some airports - Most of our airports are Type IV only now
- Yes at some airports - Most of the time (**X 3 responses**)
- Yes at some airports - Mostly good communication
- Yes at some airports - Mostly on the average
- Yes at some airports - Must ask about type of fluid approx. 15% of the time
- Yes at some airports - Not Paris CDG
- Yes at some airports - Not all deicing crews are good about giving this information. Lack at training?
- Yes at some airports - Not all ground personnel are created equal...
- Yes at some airports - Not all standardized
- Yes at some airports - Not foreign
- Yes at some airports - Not is SEL
- Yes at some airports - Not standardized procedures
- Yes at some airports - Occasionally we have to ask
- Yes at some airports - On most outstations I have to find out by asking
- Yes at some airports - Only STL
- Yes at some airports - Only at STC (home base) are we given this info
- Yes at some airports - Only at our main hub
- Yes at some airports - Only at our main hub in St. Louis
- Yes at some airports - Only isolated incident of having to ask
- Yes at some airports - Our outstations use Type I for cost reasons
- Yes at some airports - Our system requires our co. employees at major hubs
- Yes at some airports - Outer stations are not very good at volunteering this info. We, as often as not, have to solicit the type & mixture
- Yes at some airports - Outstation personnel (usually do not inform you)
- Yes at some airports - Probing need on occasion
- Yes at some airports - Required by company policy, but not enforced when using outside contractors
- Yes at some airports - See example C3
- Yes at some airports - Should be mandatory. We need the type and concentration
- Yes at some airports - Should be required, with start time and type
- Yes at some airports - Small stations don't know importance, & sometimes we have to ask
- Yes at some airports - Smaller airports usually have to ASK
- Yes at some airports - Smaller stations don't always tell you due to poor standardization or use of contract personnel
- Yes at some airports - Some int'l stations, not
- Yes at some airports - Some locations you must ask which fluid is used

Yes at some airports - Some of our airports (most outstations) have only Type I fluid to deice and most outstations do not give anti-icing information

Yes at some airports - Some outlying station use contract deice

Yes at some airports - Some people need to be prodded

Yes at some airports - Some smaller airports have low-paid personnel not well trained & who do not understand importance of job & correct procedures

Yes at some airports - Sometimes I need to ask

Yes at some airports - Sometimes they don't even give us start times

Yes at some airports - Sometimes we have to ask **(X 6 responses)**

Yes at some airports - Sometimes we have to ask; often assumed that we know already

Yes at some airports - Sometimes we're told without asking prior to deice but it's ALWAYS confirmed when completed

Yes at some airports - Sometimes you have to ask for the type and mixture

Yes at some airports - Sometimes, personnel must be prompted

Yes at some airports - Standardization is almost non-existing at different locations

Yes at some airports - TRAINING varies from the main hub & the outstations

Yes at some airports - The smaller or more away from hubs, the less professional the service

Yes at some airports - They are becoming more standard/informative

Yes at some airports - They have broken our system down to USA & others

Yes at some airports - They may have planned on telling but I ask first

Yes at some airports - This communication standard in USA; slightly different in Canada

Yes at some airports - Those which we have other than Type I available

Yes at some airports - Type I at most airports

Yes at some airports - Type IV - sometimes had to ask for the name of fluid

Yes at some airports - Usually have to ask!

Yes at some airports - Usually have to ask; and sometimes change it

Yes at some airports - Varies airport to airport. Company vs contract personnel

Yes at some airports - Varies widely with different deice crews

Yes at some airports - When deicing is subcontracted we normally have to ask

Yes at some airports - We always ask

Yes at some airports - We are not told, but we as a crew know

Yes at some airports - We ask if not told

Yes at some airports - Where icing is an immediate factor, it's required

Yes at some airports - Would be nice to have this info on our jep pages

Yes at some airports - Yes - at MOST airports

Yes at some airports - Yes, at most airports with our airline personnel but esp. not at small airports with use of non-airline personnel

No - Again, it varies with the quality of the training the ground people have had

No - Can only use 50/50 mix of Type I

No - Give us the wrong data

No - I always have to ask - even at ORD

No - I always have to request Type IV

No - Must ask station personnel

No - Nearly always have to ask

No - Not at PIT, CVG as example that come to mind

No - Often we have to ask - and sometimes the deice truck operator doesn't even know and has to ask

No - Only at hubs and only recently

No - Sometimes we have to remind the ground crew for the specifics

No - That is a problem. Have to ask, always

No - They don't know!

No - This is never volunteered

No - Verbally informed approx. 25% of the time, although usually you can see the type of fluid written somewhere on the truck

No - Very bad most places

No - We are serviced/deiced with what they have, not necessarily what we want

No - We must ask & then get a quizzical look

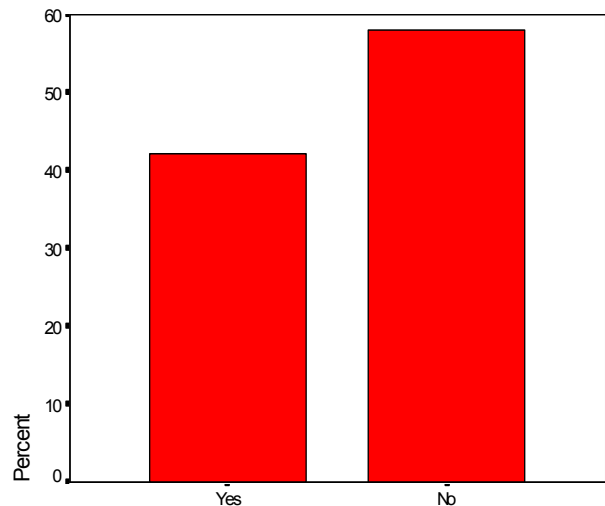
No - We usually have to ask at airports other than our hubs

Inv. resp. - At MSP and DTW I am always

Inv. resp. - At most airports, yes

Inv. resp. - Yes, at most airports some: no

D6. Do you feel there are airports that routinely use Type I fluid for anti-icing?



Are there airports that routinely use Type I for anti-icing?

[Invalid responses: 214 (14%)]

If yes, please identify the airports:

See table for individual airports, only responses not listing individual airports are given below.

Airport	Latitude	Frequency
STL	St. Louis	38 24
DTW	Detroit	42 21
MSP	Minneapolis	44 19
ORD	Chicago	41 18
ROC	Rochester	43 11
DEN	Denver	39 10
MKE	Milwaukee	42 9
SYR	Syracuse	43 8
BUF	Buffalo	42 8
MEM	Memphis	35 8
DSM	Des Moines	41 7
CLE	Cleveland	41 6
SBN	South Bend	41 6
GRB	Green Bay	44 5
BOS	Boston	42 5
GRR	Grand Rapids	42 5
AZO	Kalamazoo	42 5
HPN	White Plains	41 5
CMH	Columbus	39 5
MCI	Kansas City	39 5
TVC	Traverse City	44 4
CID	Cedar Rapids	41 4
BDL	Hartford	41 4
MLI	Moline	41 4
OMA	Omaha	41 4
FWA	Fort Wayne	40 4
LGA	New York	40 4
CVG	Cincinnati	39 4
SDF	Louisville	38 4
ATL	Atlanta	33 4
ANC	Anchorage	61 3
MSN	Madison	43 3
FNT	Flint	42 3
PVD	Providence	41 3
LNK	Lincoln	40 3
JFK	New York	40 3
ACY	Atlantic City	39 3
SPI	Springfield	39 3
ICT	Wichita	37 3
BNA	Nashville	36 3
YVR	Vancouver	49 2
MOT	Minot	48 2
GFK	Grand Forks	47 2
SEA	Seattle/Tacoma	47 2
GEG	Spokane	47 2
PDX	Portland	45 2
LSE	La Crosse	43 2
FSD	Sioux Falls	43 2
ERI	Erie	42 2
LAN	Lansing	42 2
ALO	Waterloo	42 2
TOL	Toledo	41 2
BMI	Bloomington	40 2
BRL	Burlington	40 2
CMI	Champaign/Urbana	40 2
HDN	Hayden	40 2
EWB	Newark	40 2
PIA	Peoria	40 2
BWI	Baltimore	39 2
IND	Indianapolis	39 2

.....Continued on next page

Airport	Latitude	Frequency	
MKC	Kansas City	39	2
COU	Columbia	38	2
EVV	Evansville	38	2
DCA	Washington	38	2
IAD	Washington	38	2
CGI	Cape Girardeau	37	2
PAH	Paducah	37	2
SGF	Springfield	37	2
FYV	Fayetteville	36	2
CLT	Charlotte	35	2
LIT	Little Rock	34	2
DFW	Dallas/Fort Worth	32	2
YXE	Saskatoon	52	1
YQX	Gander	48	1
FCA	Kalispell	48	1
DLH	Duluth	46	1
BIL	Billings	45	1
BZN	Bozeman	45	1
YUL	Montreal	45	1
RAP	Rapid City	44	1
RST	Rochester	43	1
YYZ	Toronto	43	1
ALB	Albany	42	1
BGM	Binghamton	42	1
ELM	Elmira/Corning	42	1
YQG	Windsor	42	1
CHI	Chicago	41	1
MDW	Chicago	41	1
YNG	Youngstown	41	1
CAK	Akron/Canton	40	1
LAF	Lafayette	40	1
PIT	Pittsburgh	40	1
WSG	Washington	40	1
DEC	Decatur	39	1
MHK	Manhattan	39	1
RNO	Reno	39	1
CRW	Charleston	38	1
GBD	Great Bend	38	1
HYS	Hays	38	1
SLN	Salina	38	1
FOE	Topeka	38	1
DDC	Dodge City	37	1
TBN	Fort Leonard Wood	37	1
GCK	Garden City	37	1
MWA	Marion/Herrin	37	1
ROA	Roanoke	37	1
SJC	San Jose	37	1
ORF	Norfolk	36	1
ABQ	Albuquerque	35	1
TYS	Knoxville	35	1
OKC	Oklahoma City	35	1
RDU	Raleigh/Durham	35	1
HOT	Hot Springs	34	1
TUP	Tupelo	34	1
BHM	Birmingham	33	1
LAX	Los Angeles	33	1
JAN	Jackson	32	1
SHV	Shreveport	32	1
TUS	Tucson	32	1
JAX	Jacksonville	30	1
MSY	New Orleans	29	1

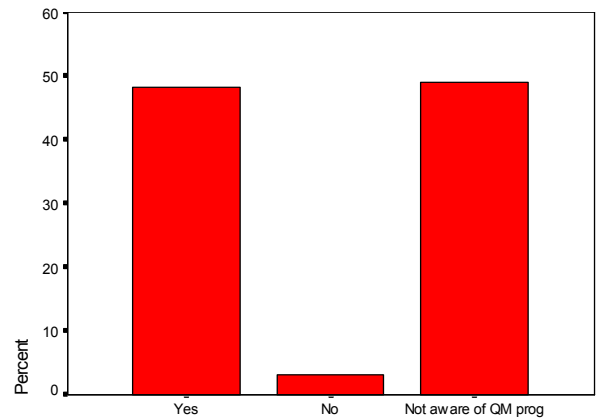
Yes - "Feel" conotes a guess; "Identify" means you know.
 C- for the question writer (is "conotes" spelled correctly?)
 Yes - "Small" UAL stations
 Yes - ALL of our outstations
 Yes - About half in the system
 Yes - Airports down south that gets little snow
 Yes - Airports which don't get a lot of freezing precip
 Yes - All airports our company flies to
 Yes - All company outstations
 Yes - All except hubs
 Yes - All of our outstations in ORD, DFW systems I have flown to
 Yes - All of our outstations (**X 5 responses**)
 Yes - All of our outstations do - that's all they have
 Yes - All of our outstations only use Type I fluid
 Yes - All of our stations outside our hubs, too many to list
 Yes - All our airports do
 Yes - All outstations from ORD
 Yes - All those airports south of a line from DCA thru OKC
 Yes - Almost all airports that we operate into and out of
 Yes - Almost all medium to small cities where we rely on FBO services for deicing & LGA
 Yes - Although I don't believe they understand the difference they provide deicing and leave all technical aspects to the crew by not routinely providing mixture and start times
 Yes - At 90% of our regional outstations Type I is the only one available
 Yes - At one time smaller stations only had Type I - now more have Type II - Not sure
 Yes - At some Southern US airports
 Yes - Availability of other fluids
 Yes - BDL, BNA, IAU, IND usually airports without airline hubs
 Yes - CMH. Non-hub airports
 Yes - Can't name any off hand, it would vary depending on the contractor
 Yes - Can't name them but have had Type I put on the a/c more than once
 Yes - Can't recall specifically
 Yes - Can't remember (**X 4 responses**)
 Yes - Can't remember but a lot of smaller stations ONLY HAVE Type I
 Yes - Can't remember specific airport recently
 Yes - Cannot recall
 Yes - Company deicing
 Yes - Company procedure dictate this
 Yes - Cost-saving, no expected taxi delays
 Yes - Couldn't be specific but they are using remaining stock
 Yes - DEC, COU, SPI, etc. all of our outstations
 Yes - DEN, DTW, and many others. Some ground deicing people are trained always use Type I unless the crew requests something better
 Yes - DTW, MSP, we are usually given choice if we want Type II or IV
 Yes - DTW, MSP, SEA. Type I is fine for certain conditions - you do not always need Type II
 Yes - DTW: When Type I is all that is required

- Yes - Denver seems to - but we've not deiced by our own crews
- Yes - Denver used to but seems to be better as of late. Used to have to fight to get Type IV
- Yes - Depends on WX conditions
- Yes - Depends on the weather
- Yes - Depends on type of precipitation occurring
- Yes - Do not recall off top of head
- Yes - Don't currently know but am aware of Type I use at many stations early this winter
- Yes - Don't know
- Yes - Don't recall - but I've gotten "We don't do that here" or "We don't have that here"
- Yes - Don't remember (**X 3 responses**)
- Yes - Don't remember the airports. If I ask I can get it
- Yes - Don't remember. Often smaller airports
- Yes - Eagle Co
- Yes - Entire route structure. Though we are approved for Type II 7 IV. I have never seen them used on our a/c
- Yes - Every airport uses it for deice, and most use it for anti-ice, that's why we have a HOT; after being deiced, it becomes anti-ice
- Yes - Every airport we serve. If we don't ask for something else, we get Type I
- Yes - Every time this year I have received only Type I
- Yes - Everywhere
- Yes - Everywhere but the hubs
- Yes - Fair weather airports in desert southwest US i.e. - TUS
- Yes - Florida
- Yes - For frost only DEN, ORD
- Yes - GRB, YUL, although I think that has changed at these 2
- Yes - HPN has ONLY Type I
- Yes - HPN. The only type of fluid in the airports
- Yes - Human nature, varies
- Yes - I don't recall, but it WAS this winter!
- Yes - I suspect there are but don't know for a fact. (Suspect airports that are normally not in a freeze zone)
- Yes - I would "assume" many still do in the mid-southern areas i.e. STL, MCM, TUC, RNO, CAS, etc.
- Yes - If precip has ended - temp about 32 degree F
- Yes - In combination all
- Yes - It is not so much "airports" as "airlines". Example: My airline uses Type I at MKE "unless" we get someone else's truck that has II or IV
- Yes - It is used if conditions warrant Type I if needed our company uses Type IV
- Yes - It's a company issue not an airport
- Yes - Last year at DLH - oh Type II or IV
- Yes - MEM & some Southern stations
- Yes - MEM, TYS, ATL, airport that do not usually see hard winters
- Yes - MSP does for light precip-can't remember this winter's circumstances at all airports, but 96-97 most airports we serviced still used Type I for most conditions except heavy snow/mod FZ rain
- Yes - Many - hundreds
- Yes - Many airports in the Midwest
- Yes - Many airports only have Type I
- Yes - Many airports we go to do not have Type IV or II. Only our hubs do
- Yes - Many of the smaller airports with limited personnel/facilities
- Yes - Milwaukee, SBN, all outstations at American Eagle
- Yes - Most (**X 5 responses**)
- Yes - Most TSA outstations
- Yes - Most airports I fly into
- Yes - Most airports do if conditions are favorable. Don't have type # at most outstations
- Yes - Most airports that are not hubs or anti-ice infrequently
- Yes - Most all outstations in the American Eagle system in ORD
- Yes - Most in one system (MAL). (Types II & IV avail. @ hubs & some outstations)
- Yes - Most Midwest airports only use Type I unless conditions require Type II or IV
- Yes - Most non-hubs (**X3 responses**)
- Yes - Most not always sure
- Yes - Most now airline (employee) contract deicing
- Yes - Most of TSA's STN use Type I due cost!
- Yes - Most of our airline station
- Yes - Most of our outstations not operated by NWA
- Yes - Most of our small airports with only 3-4 departures a day
- Yes - Most of the airports in our route structure - unless it's snowing heavily, we use Type I to keep a/c clean on taxi out
- Yes - Most of the smaller airports we fly into use Type I
- Yes - Most of the stations do
- Yes - Most outstations in medium size metropolitan areas
- Yes - Most small - that's all they got
- Yes - Most smaller airports
- Yes - Most smaller airports with small staff
- Yes - Most smaller stations with 3-5 flights per day per company
- Yes - Most when precipitation is light
- Yes - Mostly Southern States
- Yes - Mostly southern tier station where winter is a bother, not a season
- Yes - Multipac small airports in Great Lakes area. Flight crews are aware & get remote deiced at approach/depart. end of runway so they are within the 2-5 mins req. that fluid lasts (only with snow, not FZR)
- Yes - My company is too cheap to provide Type II or IV fluid. All we have is Type I
- Yes - N/A per operations
- Yes - Not sure
- Yes - Not sure of specific ones but I recall talking to crew members of the use of Type I instead of II or IV
- Yes - Not sure which ones
- Yes - Not sure, but many airports use Type I prior to likely overnight frost
- Yes - Not sure. MSP may under some conditions but I have only had it used as a deice
- Yes - Not sure/some southerly airports
- Yes - Not to my knowledge, but could be at smaller airports. Formerly was common
- Yes - Numerous domestic airports

- Yes - ORD depending on conditions
- Yes - Our airline uses Type I unless we specifically request Type II or IV
- Yes - Our company has it available at most airports and uses it when conditions allow
- Yes - Outlying airports such as FSD, RAP - possibly some Canadian - YXE?
- Yes - Outstations
- Yes - Outstations (ORD hub)
- Yes - Outstations. Only for normal deice (ice accumulated in flight-no ground deicing)
- Yes - Overseas
- Yes - PDX due to environmentalists-drain into River. MSP, DTW-to save \$ they spray with Type I in some situations where longer holdover time of I or IV would be better
- Yes - Received this once this year. Don't remember where
- Yes - STL, & all of our outstations
- Yes - Saw it once @ STL
- Yes - Seems to be airports that do not typically get freezing precip and don't have Type IV available
- Yes - Several of our outlying stations
- Yes - Several outstations!
- Yes - Several smaller stations have told me they have ONLY Type I available
- Yes - Signature flight support (MSP, DTW, MSN, CHICAGO, ORD)
- Yes - Small airports - Buffalo, Wichita, Des Moines, etc.
- Yes - Small airports such as SBN
- Yes - Small outlying a/p on route system
- Yes - Small outstations (**X 4 responses**)
- Yes - Small airports (**X 3 responses**)
- Yes - Small outstations. 3 or 4 times this year. Do not recall which ones
- Yes - Small stations that sometimes require contract MX
- Yes - Smaller US airports
- Yes - Smaller airports in upper Midwest seem to
- Yes - Smaller airports only have Type I
- Yes - Smaller like Syracuse or Lincoln, NEB
- Yes - Smaller offline airports
- Yes - Smaller stations(**X 2 responses**)
- Yes - Smaller stations, LAN, AZO, etc.
- Yes - Smaller stations with infrequent icing conditions
- Yes - Smaller, non-hub stations
- Yes - So far this winter, all I've utilized during icing conditions
- Yes - Some airports do not have Type II or IV. You must use the very limited anti-icing properties
- Yes - Some airports only have Type I - TVC, AZO, SBN, GRR - lots of small airports
- Yes - Some of our stations use Type I. Usually for RON aircraft when frost may form
- Yes - Some of the smaller locations; i.e. MOT, GFK
- Yes - Some small out lying airports (DC-9) only had Type I fluid
- Yes - Some smaller airports only have Type I
- Yes - Some smaller stations
- Yes - South America, Russia, KHV
- Yes - Southern (warmer climates)
- Yes - Southern airports high ambient temps - 0 precip rate
- Yes - Southern airports not accustomed to deicing. Don't store II or IV
- Yes - Southern airports that normally do not get much snow or cold WX
- Yes - Southern stations
- Yes - St. Louis. The ground crew there is almost allergic to the use of anything but Type I fluid
- Yes - The airports w/o Type II
- Yes - The cheap ones
- Yes - This just happened to me in CLE had to demand Type II in the re-deice
- Yes - This would probably identify my airline so no comment
- Yes - Those in mostly warmer climates
- Yes - Too many to list
- Yes - Too many! Usually small stations OMA, DSM
- Yes - Toronto, Vancouver. No Type II available
- Yes - Type I is all we use
- Yes - Type I works fine for frost
- Yes - Unable - don't remember which ones
- Yes - Unknown (**X 2 responses**)
- Yes - Unless I specify Type II or IV
- Yes - Unsure
- Yes - Up to individual airlines not airport
- Yes - Used at MKE this winter. Majority of time Type I has been used with Type II
- Yes - Very dangerous! My major concern in winter ops. Hayden, Co & Eagle Co.? The worst scenario is the small airports with short runways and poor deicing (Type I only) & geographically located in worst place (Colorado, etc.) - Heavy snow, precip fall high ...air & high density alt.
- Yes - Very few
- Yes - Warm WX airports (South)
- Yes - Warmer climate airports (even though icing has occurred). Southern cities of smaller airports
- Yes - We only use Type I so in a sense they are all used as deicing & anti-icing
- Yes - We operate out of ORD. ALL outstations use Type I for anti-icing (Type IV not available)
- Yes - When it is all that is available
- Yes - YVR for transient aircraft
- Yes - Yes, before Type II invented
- Yes - Yes, but I can't identify any specifically at this time
- No - with contract service
- No - But MDW has tried!
- No - Don't know of any (**X 3 responses**)
- No - Haven't seen Type I only for a long time
- No - I hope not
- No - In my experience the fluid is chosen by reference to existing weather conditions
- No - Most use IV these days
- No - None that I have flown with
- No - None that I know of
- No - None that we have used recently (last two years)
- No - Not any more
- No - Not at the airports where I operate. Occasionally Type I is used if conditions warrant, but normally Type II or IV is used
- No - Not for my carrier if Type IV conditions exist
- No - Not much any more

- No - Not routinely
- No - Not sure at smaller stations
- No - Not this winter, but ORD routinely used Type I the previous winter
- No - Not to my knowledge in the past few years
- No - Not with our company
- No - One time as a passenger on 747 out of Beijing I observed a/c "deiced" with fire hose and plain, not even hot, water. True!!
- No - Only used as a deicing agent
- No - Our stations use Type I with short holdover times
- No - Some smaller airports only have Type I, but make no pretense about it being used for anti-icing
- No - Type II now
- No - UAL has rigid guidelines
- No - Unknown, really
- No - Use Type I for deice
- No - We use Type I routinely at most stations to clean frost & ice & snow before using Type IV 100%
- Inv. resp. - ?? I really don't know
- Inv. resp. - ???
- Inv. resp. - Beats me!
- Inv. resp. - Can't say
- Inv. resp. - DEN; short taxi to runway
- Inv. resp. - Don't know **(X 30 responses)**
- Inv. resp. - Don't remember
- Inv. resp. - Maybe
- Inv. resp. - N/A all we use is Type I
- Inv. resp. - Need more info on what type is used
- Inv. resp. - No idea **(X 2 responses)**
- Inv. resp. - No opinion **(X 2 responses)**
- Inv. resp. - Not enough deicing exp.
- Inv. resp. - Not sure **(X 4 responses)**
- Inv. resp. - Not to my knowledge
- Inv. resp. - Probably
- Inv. resp. - Some airports only have Type I
- Inv. resp. - Type I is called deicing fluid in our company flight ops manual, but mention of some (anti-ice) protection is mentioned. The fluid/water mixture used provides freeze point at least 10C <OAT, and of course h
- Inv. resp. - Type I then Type IV if needed
- Inv. resp. - Under certain conditions many would use T1 & T1 would be adequate
- Inv. resp. - Unknown **(X 7 responses)**

D7. Does your company have a program to assess the quality or capability of deicing service provided in accordance with your company's approved ground deicing/anti-icing program?



Does your company have a quality management program to assess deice

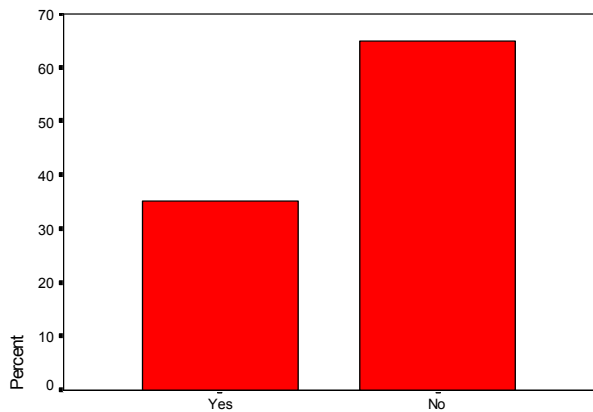
[Invalid responses: 48 (3%)]

Comments:

- Yes - A shoddy, substitute for an inspection just before takeoff
- Yes - ALPA
- Yes - Air safety Reports **(X 2 responses)**
- Yes - As with all problems, the willingness to respond when it costs \$ is the question
- Yes - But it is a Committee - don't trust Committees
- Yes - But, great variation among vendors (FBO's)
- Yes - Captain discretion
- Yes - Captain's report **(X 3 responses)**
- Yes - Company personnel are on hand during all deicing
- Yes - Company trained de/anti-icers
- Yes - Contracted personnel or company employees (if offline provision for qualification is required company contact)
- Yes - Crew feedback, and dispatch notified if HOT exceeded
- Yes - Debriefing documents
- Yes - Feedback is requested
- Yes - Flight manager visits to station
- Yes - Good ground crew training program
- Yes - Great program!
- Yes - I assume so
- Yes - I believe so
- Yes - I believe they do, but not positive. Responsibility of ground ops dept.
- Yes - I don't trust it though
- Yes - Informal crew comments
- Yes - N/A
- Yes - Not specifically for deice but we have progress
- Yes - Pilot submitted safety reports
- Yes - Probably
- Yes - Program QA plus pilot feedback
- Yes - Recently 2 deicers were decertified and retrained
- Yes - Suppose so
- Yes - Their ability is sometimes suspect because of their infrequent use
- Yes - There is a manual and annual training

- Yes - Though the normal flight debrief proc.
 Yes - Through our pink sheets
 Yes - Unfortunately it varies from station to station
 Yes - We are encouraged to report problems with Capt. reports
 Yes - We are requested to evaluate the quality using a pilot's written report
 Yes - We are told they do & that they train them
 Yes - We can file reports, we will get a reply
 Yes - We receive a report stating time and type of deicing
 Yes - Whoever we use - they approved
 No - But I'm sure there is some kind of plan
 No - Company doesn't care about quality of deicing equipment/procedures at its stations
 No - Deicing is approached all too often as an after thought. Ground personnel are too ignorant of the
- No - Our program is by the book at the hub, the outstations are ridiculous. Ha! Ha!
 No - Supposedly they do, but the implementing people don't follow through
 No - That would be great - especially if they used it!
 No - Training at outstations is sometimes very poor, equipment is often poor
 Not aware of QM program - A program may exist
 Not aware of QM program - All contractors seem to be using company approved procedures
 Not aware of QM program - But I suspect they do
 Not aware of QM program - But am sure we have it
 Not aware of QM program - But, I'm sure they must
 Not aware of QM program - Captains may fill out Capts operation/safety report if quality is in question
 Not aware of QM program - Carrier has comprehensive training for personnel
 Not aware of QM program - Complaints would be brought to the attention of our Chief Pilot by the pilot
 Not aware of QM program - Doesn't mean there isn't one. My opinion is not solicited
 Not aware of QM program - Don't know
 Not aware of QM program - Don't think it exists
 Not aware of QM program - Good idea
 Not aware of QM program - Have no idea
 Not aware of QM program - Hope so. Probably up to station Managers
 Not aware of QM program - I am sure we do - but don't know
 Not aware of QM program - I assume they do have such a program
 Not aware of QM program - I don't know. Our company trains contractor deicers
 Not aware of QM program - I figure it's mandated by FAA!
 Not aware of QM program - I hope so!
 Not aware of QM program - I would bet they do
 Not aware of QM program - I'm sure there is a quality control program since our deicing is done in house
 Not aware of QM program - If we don't, this would be a great quality control item
 Not aware of QM program - It may well exist though
 Not aware of QM program - It more than likely does
 Not aware of QM program - It probably exists but I'm not aware of it
- Not aware of QM program - Just standard ASR, etc.
 Not aware of QM program - Most is done by the company
 Not aware of QM program - Not a specific deicing program - but many other ways to provide feedback on the process
 Not aware of QM program - Not sure - we could always file a Captain's report
 Not aware of QM program - Observed by a supervisor - but can't watch all operations
 Not aware of QM program - Our crew are retrained every year-I'm not sure if that qualifies
 Not aware of QM program - Probably
 Not aware of QM program - Probably a program but not aware
 Not aware of QM program - See D5
 Not aware of QM program - There probably IS one, but I'm not aware
 Not aware of QM program - They do what is required by FAA
 Not aware of QM program - We are encourage to write up any problems
 Not aware of QM program - We have a good program but not aware of the quality
 Not aware of QM program - You can always submit Captain's report
 Not aware of QM program - You get what they say
 Not aware of QM program - list
 Inv. resp. - Don't know (**X 4 responses**)
 Inv. resp. - Don't know, but for as good as the crews are, one must assumes some training is done
 Inv. resp. - I'm pretty sure our maintenance dept. has an initial check/review & follow up of authorized services
 Inv. resp. - Not sure
 Inv. resp. - Probably

D8. Given that you are within the HOT limits for freezing drizzle or light freezing rain, does this mean you can safely takeoff in those conditions?



Given within HOT for light FRDZ, does this mean you safely TO in those

[Invalid responses: 112 (7%)]

Comments:

- Yes - "SHOULD" be!
- Yes - (Poor question)
- Yes - Absent indications to the contrary
- Yes - According to our operating manual we can operate under these conditions
- Yes - Actual condition assessment and wing visual as necessary
- Yes - After visual check/inspection (**X 5 responses**)
- Yes - Again a judgment call
- Yes - Again, we tend to be taught to have & thus have complete trust in those published HOT's for the specific conditions
- Yes - Aircraft never certified in freezing rain conditions
- Yes - Airplane wise-the field conditions might dictate otherwise
- Yes - All T/O conditions must be met
- Yes - Although there are no guarantees
- Yes - Any delay to T/O position & I would like to visually check for fluid failure
- Yes - As always, the heaviness of the precip. and/or the accuracy of the WX report has the greatest impact on the decision-making process
- Yes - As long as a visual check of the wings is done
- Yes - As long as other checks appear appropriate
- Yes - As long as you are within the holdover time you are safe to takeoff
- Yes - As long as you check wing just prior to takeoff
- Yes - As long as you feel there are no unusual circumstances such as heavier precipitation or premature fluid breakdown or a unsatisfactory visual inspection
- Yes - Assuming a visual check is performed
- Yes - Assuming crew has determined it is safe with no ice accumulation
- Yes - Assuming successful visual check
- Yes - Assuming we are speaking only of the airframe, must still consider engines + R/W conditions
- Yes - Assuming we are using Type II fluid and visual check has been accomplished, or if Type I, a hands-on tactile check has been performed
- Yes - Because holdover times are extremely short, I feel comfortable since this is always done at a remote site
- Yes - But I feel this type of precip is much colder and freezes faster and the HOT are not realistic
- Yes - But I'd do a visual check
- Yes - But if there is any doubt, perform visual check
- Yes - But it depends on fluid used. Newer types have a higher confidence level in my opinion
- Yes - But need to check the wings within 5 minutes of takeoff
- Yes - But not if it is classified as "heavy"
- Yes - But only if a visual check confirms your safety
- Yes - But pilot judgment comes into play (our company does not allow T/O in light freezing rain)
- Yes - But would still make a visual
- Yes - Conditions must be - LIGHT -
- Yes - Conditions vary
- Yes - Consider the OAT
- Yes - Coupled with the visual check-although I would appreciate some visual guidance on appearance of fluid failure
- Yes - Deicing usually discontinued by company if WX conditions degrade deicing to point where HOT are not deemed accurate
- Yes - Depends on WX conditions and wing condition
- Yes - Depends on condition of aircraft surfaces
- Yes - Depends on conditions & pre-takeoff check of critical surfaces
- Yes - Depends on the intensity
- Yes - Depends on time between completion of de/anti-ice and T/O
- Yes - Depends on who does the deicing
- Yes - Depends, heavy, moderate or light you have to look at each situation
- Yes - Depends. Should have a tactile check prior to departure
- Yes - Each situation has to be evaluated
- Yes - End of runway deicing is needed to ensure HOT is not exceeded
- Yes - Even though within HOT, I would check wing condition prior to takeoff roll
- Yes - Generally speaking, however good judgment at the time is best answer
- Yes - Given that precip do not indicate heavier icing on climb out
- Yes - Given the short HOTs, I'm pretty confident
- Yes - HOT is very short in those conditions
- Yes - However, inflight icing may be a major factor, also - rate of precip may affect HOT adversely - a subjective "YES" on this one - actually, it should be "MAYBE"
- Yes - However, this is a case by case issue. Tough to make a general statement
- Yes - I always use lower end when dealing with freezing drizzle, ice pellets, etc.
- Yes - I assume these values are conservative
- Yes - I believe this to be usually true if I had a question I would have the visual inspection done

- Yes - I combine this with visual check from cockpit. If close to limit I go back to overwing exit
- Yes - I do not believe that the 747-400 wing is as critical as some other types
- Yes - I do rotate very slowly-flying as if the aircraft were very heavy on initial rotation
- Yes - I feel that HOT's are very conservative
- Yes - I feel the HOT limits are so restrictive, takeoff before HOT limits are exceeded can rarely occur. A tactile test is then required
- Yes - I feel the HOT's are very conservative
- Yes - I have taken off in these conditions many times-secondary indications must also be considered
- Yes - I hope the times are good or have the times changed
- Yes - I still look for any indication that
- Yes - I thought that is what anti-icing fluid and HOT's are for! (Am I wrong?)
- Yes - I trust the FAA has done significant research on the matter
- Yes - I use all information at my disposal to make my decision; manuals/charts visual inspections, etc.
- Yes - I would check first
- Yes - I wouldn't takeoff if I didn't
- Yes - I'm saying yes. Because I just did it last week out at DTW. We felt safe and were very aware of the outside conditions
- Yes - If ALL conditions are satisfied
- Yes - If a visual check also confirms clean a/c
- Yes - If a visual check indicates it's safe
- Yes - If a visual check reassures the a/c is clean
- Yes - If a/c checks OK with no ice
- Yes - If a/c is clean - no. Ops if freezing precip is heavy - i.e. freezing rain
- Yes - If an adequate visual inspection is done
- Yes - If deice was done properly & holdover time not exceeded
- Yes - If deicing was done correctly
- Yes - If deicing was thoroughly done (see D4) HOT are very short
- Yes - If existing conditions are such and fluid is adequate
- Yes - If flight crew determines that there is no contamination (fluid failure)
- Yes - If icing in clouds not moderate to severe
- Yes - If in doubt, check it out
- Yes - If inspected just before T/O
- Yes - If inspection is made of the airfoil surfaces
- Yes - If inspection of surfaces looks OK
- Yes - If inspection of wing, etc. is clear. Hard to determine on 727, so usually don't go past HOT
- Yes - If it doesn't then we have been lied to!
- Yes - If it's under the minimum holdover time
- Yes - If not - then the HOT limits are meaningless & some other procedure must be developed
- Yes - If satisfied with pre-takeoff check, pre-takeoff check = within HOT Pre-takeoff contamination = after HOT
- Yes - If the freezing precip became heavy it may not be safe
- Yes - If Type IV used
- Yes - If visual check confirms
- Yes - If visually inspected prior to T/O and in crews judgment it is safe
- Yes - If within company guidelines
- Yes - If you got Type I then II or IV followed by the normal short holdover time
- Yes - If you've done your pre-dep. contamination check
- Yes - In general, yes
- Yes - In most cases, yes
- Yes - In theory
- Yes - Is this a trick question?
- Yes - Isn't this way we here chits?
- Yes - It's only 5 minutes
- Yes - Maybe again rate, time & visual
- Yes - Maybe if no accumulation of precip. If a/c is clean if Type II or IV fluids are used
- Yes - Memory; don't have books/procedures available
- Yes - Must check wings
- Yes - Must exercise some judgment
- Yes - Must make a decision based on actual conditions each time
- Yes - My assumption would be that Type II or IV fluid would hold until HOT expired
- Yes - Not a "YES" or "NO" question, maybe within 2 mins of deicing or 10 min of deicing, maybe no
- Yes - Of course - you never really know
- Yes - Only after visual inspection and judging the actual intensity
- Yes - Only if all other indications are favorable
- Yes - Only if it is light freezing drizzle or rain
- Yes - Only if wing is clear of buildup
- Yes - Only if you have determined during your pre-takeoff contamination check that you are clean!
- Yes - Only in lower range of HOT
- Yes - Only light freezing drizzle
- Yes - Only with visual verification
- Yes - Other things being equal
- Yes - Our FOM specifically addresses what conditions are allowable
- Yes - Our airline does not use the "HOT" term - a little unfamiliar
- Yes - Permitted by FOP
- Yes - Pre-takeoff contamination check
- Yes - Probably
- Yes - Probably
- Yes - Probably - but most check
- Yes - Probably would do a visual check to backup the chart
- Yes - Probably, but specific existing conditions must be judged
- Yes - Provided a clear wing check completed and appears airplane is free of adhering precip
- Yes - Provided experience and knowledge are applied to each situation
- Yes - Provided pre-takeoff contamination check is performed
- Yes - Provided the intensity if "light", and braking action no worse than fair
- Yes - Provided Type IV is used
- Yes - Provided wing is clean
- Yes - Provided you are reassured visually & de/anti-iced
- Yes - Providing I don't suspect buildup of contaminants
- Yes - Providing the appropriate checks are made and HOT is strictly observed
- Yes - Runway conditions usually prove to be limiting

- Yes - Safety built into holdover tables
 Yes - Somewhat unsure
 Yes - Specifically addresses the above
 Yes - Subject to pilot discretion, and evaluation of the circumstances
 Yes - Subsequent to visual check
 Yes - T/O allowed. I think the abort would be bigger problem
 Yes - Take a look! No ice after checking? takeoff
 Yes - The HOT guidelines are conservative and you have to trust them if you ever want to go flying
 Yes - The holdover time is so short that I don't see much likelihood of a problem
 Yes - This is a good indicator when used with at Type IV fluid
 Yes - This is a tough can I visually go back to cabin & look out window
 Yes - This is when the visual inspection is very important
 Yes - This would not preclude a visual inspection prior to takeoff
 Yes - Trick question
 Yes - Type IV ULTRA is great stuff. Inspections have revealed no failures - it works great!
 Yes - Under our program, yes. I inspect in from cockpit if it expires is pointless. The bottom line is if you're within holdover times for condition-we takeoff-SO YOUR CHARTS HAD BEST BE FLAWLESS
 Yes - Unless the precip is heavy or moderate
 Yes - Unless you are close to the upper range
 Yes - Use corrections from manual - adjust speeds/rotation
 Yes - Using Captains (mine) experience and observation/check of wing - surface
 Yes - Usually (**X 4 responses**)
 Yes - Usually given external conditions
 Yes - Verify with visual check
 Yes - Very short HOT for freezing rain - I'm assuming we're OK
 Yes - Visual check prior to takeoff still required with any kind of precip. freezing
 Yes - Visual inspection
 Yes - We are allowed to T/O and land per ops manual with light-mod freezing drizzle & light freezing rain
 Yes - We do not takeoff in mod freezing rain. No matter what. So the definition of light is important
 Yes - We have to depend on some method of ice safety. I feel the HOT is very conservative
 Yes - We still visually check
 Yes - While I do a visual check I feel it is unrealistic. HOT provide realistic guidelines
 Yes - Why else have HOT - I use it for guidance but still check from cockpit and or cabin
 Yes - Wing must be checked
 Yes - With a cockpit or cabin check
 Yes - With a little check of the airfoils
 Yes - With at least a visual check
 Yes - With cabin viewing verification
 Yes - With no other factors affecting T/O
 Yes - With Type I in these conditions deicing has to be done at the runway, if not, then Type II or IV is required to have the confidence to safely t/o
 Yes - With verification that the fluid has not failed
- Yes - With visual concurrence
 Yes - With visual confirmation
 Yes - With visual check/inspection (**X 4 responses**)
 Yes - With visual pre-departure check
 Yes - Would assume so if ground surface OK
 Yes - Would depend on situation
 Yes - Yes - as log as a pre-takeoff inspection/evaluation is conducted
 Yes - Yes with a visual check
 Yes - Yes, although I consider HOTs to be a guide, a tool, not absolute
 Yes - Yes, if you were adequately deiced in the first place
 Yes - Yes.. but, only if just before T/O conditions are safe
 Yes - You tell me differently. If we aren't, HOT times are no good
 Yes - You're safe on paper only though. Assessment of current conditions, runway conditions, wind, braking action all play a factor
 No - A HOT helps. Common sense, experience, and inspection are the best
 No - A pre-takeoff contamination check is still required and since we don't commonly use Type II or IV, a hands on tactile check is required
 No - A successful visual inspection is also required
 No - A visual inspection is the only way to feel comfortable
 No - ATR is not certified for flight into severe ice. These conditions meet the definition of severe ice
 No - Absolutely no delays acceptable under these conditions
 No - Absolutely not. I am appalled that this continues to happen (pilots takeoff in such conditions)
 No - According ALPA - No a/c has been tested and certified in such conditions
 No - Additional considerations - airport surfaces - flight conditions after takeoff
 No - Adherence of ice to other portions of the airframe is not addressed in freezing rain conditions, this could be very critical
 No - Again - a judgment call
 No - Again a visual check
 No - Again the HOT is only starting point. A pilot looking at the wing is the best means of est. clean wing, however, that pilot must be properly trained
 No - Again, common sense dictates that you assess the situation as it happens
 No - Again, this is left to interpretation; one man's light freezing rain is another's freezing drizzle!
 No - Again, we rely on actual conditions & insp. rather than a book time
 No - Airport conditions another consideration
 No - All conditions are different the HOT limits are just a guide
 No - All factors must be assessed, of course. No concrete answer can be given
 No - Also must use common sense and good judgment
 No - Always check (**X 2 responses**)
 No - Always do a visual check
 No - Always usually check in those conditions
 No - Always visually verify a/c surfaces
 No - An inspection necessary

- No - Anti-icing has no effect on hazards after T/O, however the HOT time is useful on the ground
- No - Any freezing precip gives me concern
- No - Apparently FAA didn't actually test planes in freezing rain
- No - As I understand, freezing rain would mean severe icing could be expected, and no a/c is certified for flight into severe ice
- No - As I've noted, HOT is ONE facet of the total decision
- No - As with anything, quality of the job done counts & judgment - gut feel by the crew counts
- No - Assess conditions
- No - Blow off?
- No - Borderline hazardous conditions - Table is the least trusted
- No - But the book says yes!
- No - But we do regularly. Aircraft are not tested or certified for that!
- No - But we will be questioned if we return
- No - Captain is ultimately responsible
- No - Check aircraft
- No - Check required
- No - Check the wing
- No - Check the wing first
- No - Check visually
- No - Check wing visually
- No - Company SOPs
- No - Company policy manual does not allow T/O in light FZ RA or moderate FZ DZ
- No - Company prefers we do not! So does FAA!
- No - Company prohibits T/O with freezing rain
- No - Company restrictions for ops depending on intensity
- No - Company should be required to use liquids with greater HOT. Not to be a factor of.
- No - Conditions + situations change
- No - Conditions can change which obviates the data your takeoff decision is based on
- No - Conditions vary
- No - Confusing question. There are several variables here which are not addressed
- No - Contamination tough to see
- No - Could encounter heavier freezing rain on climb out
- No - DC-9-10 requires tactile check
- No - Depends - I don't like operating in freezing drizzle or rain
- No - Depends on a/c operating specs. & runway conditions
- No - Depends on amount and conditions
- No - Depends on amount of precip
- No - Depends on condition & time on the ground
- No - Depends on [actual] conditions (**X 9 responses**)
- No - Depends on how much freezing rain or drizzle
- No - Depends on lots of factors not just the term "light"
- No - Depends on other conditions taxiways, runways, time to get from gate to runway and has precip. changed or increased from time of deice to takeoff
- No - Depends on our last visual inspection. I request one every time in these conditions
- No - Depends on quality of deicing/anti-icing
- No - Depends on rate of precip & OAT
- No - Depends on specific conditions. Every time is different. Always check surfaces and re-deice as necessary
- No - Depends on temp, severity, able to see the wing, day or night, intensity
- No - Depends on the consistency of the precipitation
- No - Depends on the rate of precip. falling
- No - Depends upon size of droplets and how well wing was covered by deicing crew. Did they cover 100% of wing & control surfaces?
- No - Depends upon Type I, II, IV!
- No - Don't fly
- No - Don't fly in freezing rain
- No - Don't trust HOT times either
- No - Due to danger of freezing precip-each case must be judged carefully-my trust in safety of TO would decrease the deeper I got into HOT
- No - Each case different check yourself visually
- No - Each situation MUST be evaluated on its own. This ALWAYS must be SCD
- No - Each situation must be assessed separately, specially at night
- No - Each situation requires judgment based on experience
- No - Environmental conditions are factored in
- No - Environmental factors/other a/c jet blast can alter actual HOT
- No - Every case requires evaluation
- No - Every situation is different
- No - Every takeoff in icing condition is a risk. If proper procedures are followed then the FAA says it's safe
- No - FOM operating limits
- No - FZDZ & FZRA are the worst with shortest HOT's
- No - Flight manual may not allow it
- No - Freezing drizzle and freezing rain is nasty stuff. The airforce/navy/army prohibits takeoffs and landings (except during war)
- No - Freezing drizzle is to subjective
- No - Freezing drizzle/rain means I will determine this myself. This to me is the most critical precip.
- No - Freezing rain gets my attention; snow is almost never a problem in recent history; 1979 that was another story
- No - Gotta look @ the wing
- No - Guesswork
- No - HOT are advisory only
- No - HOT are guidelines only
- No - HOT are guidelines. Precip rates/and temp can have varied results
- No - HOT are only for ground use. My a/c, as most a/c are not certified for flight in freezing drizzle as stated in AFM
- No - HOT is a guide not a guaranteed
- No - HOT is only a guide or starting point. No guarantee
- No - HOT limit are for
- No - HOT limits are almost too short to be useful
- No - HOT limits are guides ONLY. Also see my answer to question D3
- No - HOT limits are merely a guide
- No - HOT should not be the only deciding factor
- No - HOT time only a recommendation
- No - HOT very subjective. Need to see if precip falling

- No - HOT without a visual check
- No - Have aircraft inspected from OUTSIDE
- No - Holdover time does not guarantee clean wing
- No - I ALWAYS check!
- No - I always check the wings under this condition plus the condition of the runway. I want everything in my corner when I have to deal with freezing rain
- No - I always have the wings checked
- No - I always inspect in these conditions and am highly suspect
- No - I am never comfortable in freezing rain or drizzle
- No - I check the wings first
- No - I check the wings just like always, but freezing rain is bad news no matter what you do
- No - I consider freezing drizzle & rain a no-go item for takeoff
- No - I do not depart under such conditions
- No - I don't believe a blanket assessment fits all scenarios
- No - I don't believe in taking off while in freezing precipitation
- No - I don't believe we should fly in freezing rain/drizzle
- No - I don't feel that HOT is ever good as the only factor in determining T/O safely
- No - I don't feel the ATR is good in ice. I'm very cautious
- No - I don't fly in freezing rain
- No - I feel that deicing/anti-icing is quite a subjective thing, & that the FZ rain is more difficult to assess than snowfall
- No - I feel you must check due to the nature of the precip or procedures might differently
- No - I returned once under this conditions a few years ago
- No - I still need to make a visual inspection
- No - I still perform a visual check if there's any doubt
- No - I think a surface check by the crew is appropriate
- No - I trust neither conditions
- No - I trust only my eyes - not some calculation out of a book to tell me I'm safe to T/O
- No - I want a visual check for accumulation
- No - I will always delay departure, then re-deice before takeoff
- No - I would be very conservative with these conditions
- No - I would still do the check prior to takeoff to determine if I was OK to takeoff
- No - I'd be very hesitant to operate in freezing drizzle or rain
- No - I'd demand a physical check of surface
- No - I'd get a visual inspection depending on the conditions
- No - I'd want a tactile check
- No - I'm not comfortable without a visual inspection during freezing precip.
- No - I'm the man!
- No - Ice can accumulate even though aircraft has been deiced
- No - If I cannot see the wing to make a good judgment we must be re-deiced
- No - If close to HOT limits
- No - If freezing drizzle or freezing rain check your wings anyway to verify
- No - If freezing drizzle or light freezing rain present SLD's also could form after departure + additional accumulation on tail or other a/c surfaces
- No - If in doubt, look at the wing
- No - If it looks good, it's safe
- No - If light should be OK however
- No - If within built-in safety parameters of program
- No - Implication by charts is yes... But each chart clearly state "For guidance only" ... obviously not definitive!
- No - Impossible to tell
- No - In moderate drizzle or freezing rain we discontinue operations. We are very conservative with freezing drizzle or rain
- No - In our operations we are required to do a tactile test within the HOT
- No - In these conditions I would like to visual check first
- No - In these conditions deicing just prior to takeoff would be safest
- No - In these conditions you exercise extreme caution, only if you're 100% certain will you launch
- No - Individual assessment is still required
- No - Intensity of precip
- No - Intensity of precip may change
- No - Intensity of precip would matter
- No - Is this a quiz or a questionnaire. As with any deice situation HOT is not an absolute - there are always variables
- No - Is this a trick question? Only looking will tell
- No - It depends - have to visually check
- No - It depends on a contamination check before T/O
- No - It depends on accumulation "what's on your surfaces is the key"
- No - It depends on precip rate & type observed, but usually yes
- No - It depends on rates of falling precip & how close to HOT
- No - It depends upon conditions at airport/type of fluid/temp/precip amount/etc.
- No - It does mean you're OK most of the time but there is always a possibility
- No - It is always wise to do a pre-contamination check
- No - It is assumed, but evaluation of all factor must be considered first
- No - It is impossible to assess critical elevator and rudder surfaces which are not heated inflight!
- No - It may not be as light as you think
- No - It's a good idea to check
- No - It's advisable to check wing surfaces first
- No - It's hard to determine what is "light" vs "moderate" due to the subjectiveness of the call. Lots of other variables such as wind blast from other jets, the weight/flap setting of the a/c
- No - It's only part of the picture-but my general answer to your general question is freezing drizzle or rain anytime-really needs attention
- No - It's safer to make a visual check during "freezing" precip., even though the time limit is not expired
- No - It's very hard to tell the wings conditions from cockpit
- No - Judgment (**X 2 responses**)
- No - Judgment - runway condition, WX, weight, precip.
- No - MUST visually look & decide if that particular takeoff will be safe
- No - Makes for a nervous climbout

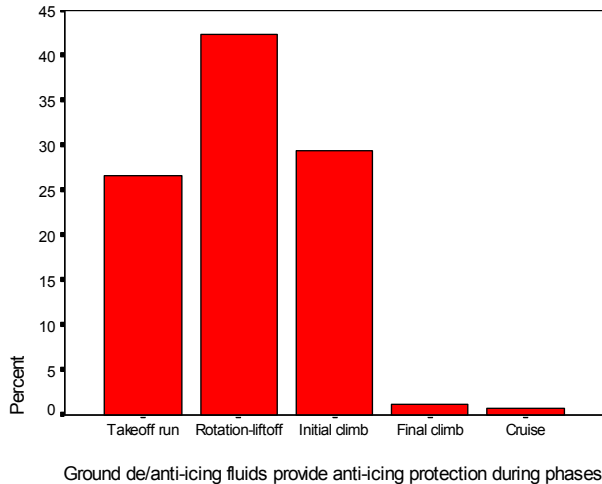
- No - Many factors affect wing icing. HOT charts and tables are just estimates
- No - Many factors are involved
- No - Many factors besides clean wing in this type precip!
1) Rwy slippery 2) engine anti-ice, etc.
- No - Many other variables
- No - Many variables, including runway conditions, length, x-winds, a/c weight
- No - May be within HOT but may have fluid fail
- No - May have to visually check the wing
- No - Maybe (**X 2 responses**)
- No - Maybe - I ALWAYS check freezing precip
- No - Maybe yes, maybe no
- No - Means maybe you can safely takeoff
- No - Might depend on many other factors. Is certainly a good indication, however
- No - Must always pass visual inspection regardless of HOT limits
- No - Must assess runway surface length conditions each T/O
- No - Must assess surface & conditions
- No - Must be assessed by crew
- No - Must check [critical surfaces/wings] (**X 5 responses**)
- No - Must do a contamination check
- No - Must do required checks
- No - Must have visual check
- No - Must make visual inspection prior to T/O, last move for FZ, FR
- No - Must still check
- No - Must still view wing and determine that surfaces are clear
- No - Must still visually check
- No - Must use Type IV
- No - Must verify wing condition
- No - Must visually check. These are only guidelines
- No - Must visually inspect
- No - Must visually inspect - make judgment
- No - Must visually verify condition of fluid, weather conditions vary too much to rely on any one graph to determine its condition
- No - My on-the-job training has hardened me to never return-it's never really that bad and the wing looks clean
- No - NO CLEAR DEFINITION FOR THESE TYPES OF PRECIP! Experience & guesswork only tools you have
- No - Need hands on check
- No - Need to look
- No - Need to perform a tactile test for assurance of a clean wing
- No - Need to verify
- No - Need to visually check (**X 3 responses**)
- No - Needs additional clarification
- No - No
- No - No - that's why we do a pre-T/O contamination check
- No - No T/O is ever attempted in this condition
- No - No chart can replace common sense & good judgment
- No - No flight data collected as far as I now for ops into such conditions. However everybody does it
- No - No guaranties for such conditions
- No - No ice on wing, period
- No - No one can
- No - No operation should be conducted on any type of freezing drizzle or rain.
- No - No takeoff in freezing rain
- No - No takeoffs allowed in this type of precip
- No - No, the HOT limits can be altered considerably by factors such as windy conditions or exposure to jet blasts
- No - Not a given - you must take into consideration type of precip-temp-how far into HOT
- No - Not allowed to fly in freezing rain
- No - Not allowed to takeoff in
- No - Not always (**X 5 responses**)
- No - Not always, depends on severity of condition
- No - Not at all times!
- No - Not if ice is on the a/c
- No - Not if you have fluid failure
- No - Not in an ATR - are you crazy?
- No - Not in an ATR!
- No - Not necessarily (**X 7 responses**)
- No - Not necessarily - Depends on what is happening to your wing
- No - Not necessarily - many factors to consider
- No - Not necessarily this must be assessed
- No - Not necessarily, wing should be inspected
- No - Not necessarily-still need visual assessment
- No - Not necessarily. You have to visually check. Nobody can fool Mother Nature
- No - Not necessarily. You still should make visual inspection
- No - Not on the ATR - no way
- No - Not personally
- No - Not safe but well never be addressed to money matters
- No - Not without a visual check (**X 2 responses**)
- No - Not without visual confirmation that contamination has not occurred
- No - Nothing in this subject area is "given" or the same every time
- No - Nothing is for certain - fluid can break down prior to its intended breakdown range
- No - Nothing regarding cold surfaces and is certain
- No - Only if aircraft is clear of snow/ice
- No - Open cockpit window and feel the skin
- No - Ops suspended
- No - Other conditions - i.e. braking and abort options
- No - Other conditions must be considered - the question is too vague
- No - Other factors can affect the properties of anti-ice fluids i.e. jet blast, high wind
- No - Other factors need to be considered. Wind, jetblast, etc.
- No - Other factors such as jetblast on one of your surfaces may have caused fluid failure
- No - Our holdover times are so unrealistic that they expire before they finish deicing
- No - Pilot discretion + Company procedures
- No - Pre-T/O contamination check more important to me
- No - Pre-takeoff check
- No - Pre-takeoff critical surface inspection

- No - Probably are, no guarantee
- No - Probably but I will still have a visual check prior to T/O
- No - Prohibited per company
- No - Rate of precipitation is essential i.e. could it wash fluid
- No - Re-evaluate conditions at takeoff and I always require a visual inspection
- No - Reality is you go. There is no real way to tell so it's the best guess!
- No - Reason for pre-contam. check
- No - Rely on experience
- No - Runway conditions and crosswind components need to be closely monitored
- No - Runway conditions may preclude safe departure
- No - Runway/taxiway may be unusable-directional control doubtful
- No - Seems to me that freezing rain presents greatest hazard
- No - Should be able to, still need to check wings
- No - Should check the wings anyway, regardless-freezing rain/drizzle is the worst possible condition
- No - Should continuously monitor outside conditions as well as buildup rates
- No - Still check wings
- No - Still have to assess overall condition of aircraft
- No - Still must inspect for fluid failure
- No - Still must make visual inspection
- No - Still must visually check (**X 2 responses**)
- No - Still need to make a contamination check
- No - Still need to make a safety inspection from the cockpit
- No - Still need to visually check
- No - Still require visual pre-takeoff check (we use only Type II or IV in these conditions)
- No - Still requires visual check
- No - Still visual check in order
- No - Still visually check the surface
- No - Super cooled droplets are tough and we exercise extreme caution
- No - Tactile check required
- No - Takeoff in freezing drizzle & always a gamble
- No - Taking off in freezing rain/drizzle is dangerous. Maybe safe if deice while holding sort
- No - Temp & accumulation rates vary
- No - Terms are too subjective
- No - The HOT means nothing if the fluid has failed and ice has formed
- No - The company would still try to dispatch the flight
- No - The confidence to say yes is not unequivocally there!
- No - The degree of freezing drizzle or lt. freezing rain is very subjective & can change quickly
- No - The dynamics of each situation dictate an assessment of each situation
- No - The visual assessment is most important - not HOT times
- No - There are FAR too many variables. Many crews look at this tables in the book, and that is the "gospel".. If it says go, they go!
- No - There are many variables
- No - There are no guarantees (**X 2 responses**)
- No - There are no guarantees! Depends on local conditions
- No - There are other factors, such as wind, runway condition, etc.
- No - These are the most dangerous conditions and require the most caution
- No - These conditions are not included in the HOT tables forms
- No - They are a guide only!
- No - This WX is DANGEROUS! Common sense
- No - This again is why HOT's are useless in their present form
- No - This is a judgment call
- No - This is a subjective judgment
- No - This is a very dangerous condition - and should be avoided
- No - This is a very subjective question
- No - This is biggest area of "head in the sand" - especially how it relates to runway condition for aborted takeoff
- No - This is one case where I want the S.O. to make a visual inspection from the cabin
- No - This is one of the worst conditions for flight ops
- No - This is probably most disconcerting WX we have to deal with
- No - This is strictly a judgment call - takeoff or not to takeoff
- No - This would be an assumption. Assumptions have killed many a flyer
- No - Time limits - immediately after deice or 10 minutes later with heavier drizzle/rain
- No - To many outside factors, visual is still the only way
- No - To me it depends on where done and time before T/O
- No - To me not without visually checking and confirming condition of wings
- No - Too many other variables are involved to honestly say it's safe for T/O inside the HOT
- No - Too many variables
- No - Too many variables (wing temp, effect of wind, etc. etc.)
- No - Too many variables - Intensity, temperature; fluid types and temps when applied
- No - Toughest conditions to assess
- No - Type IV/end of runway/takeoff pronto. Our company doesn't want us taking off in these conditions
- No - Unable T/O in freezing rain. Holdover very limited
- No - Under these conditions more equipment to examine wing from cabin to determine condition
- No - Use common sense
- No - Very difficult to evaluate fluid failure, rapid ice buildup possible
- No - Very hard to see ice under these conditions
- No - Visual assessment is best way to make this decision
- No - Visual check/inspection required (**X 6 responses**)
- No - Visual check always (**X 2 responses**)
- No - Visual check final determination
- No - Visual check is important
- No - Visual check usually required
- No - Visual inspection & judgment
- No - Visual inspection is also needed in these conditions
- No - Visual inspection is the clincher
- No - Visual inspection of wing should be performed
- No - Visual inspection required by flight crew prior to T/O
- No - Visual inspection would be required

- No - Visual/HOT/and precip rate - temps. All impact on operation
- No - Watch conditions closely
- No - We are not authorized
- No - We are not permitted to takeoff in freezing precipitation classified as greater than light
- No - We are too dependent on the evaluation of what is "drizzle" or "light"
- No - We cannot take off in either of those condition
- No - We don't depart in FZ RA, FZ DZ
- No - We go by our FH Manual and company FH ops manual
- No - We have guideline for no takeoff during MOD or heavy
- No - We have restrictions for freezing rain/drizzle. Rain can look like fluid breakdown. Hard to tell
- No - We must still assess the situation. Freezing precip. is the toughest
- No - We still are required to make visual inspection
- No - We still use a pre-takeoff visual check in these cases
- No - We suspend operations for a very good reason
- No - We would visually confirm
- No - What is runway condition? Changes in precip rates & emp are key in this issue
- No - While HOTs are the best tool, they don't replace experience and good judgment. Each situation must be evaluated
- No - Wing check always required
- No - Wings must still be inspected
- No - With freezing rain I thing some type of wing inspection should occur if more than 5 min from deice
- No - Would check prior T/O
- No - Would depend on quality of deicing application & quality of fluid
- No - Would depend on several other factors too
- No - Would still do pre-contamination check
- No - Would still have to check visually prior to takeoff. (Hands-on would be best)
- No - Would visually check if in these conditions
- No - You are at risk
- No - You can only safety takeoff if the fluid has not failed and was correctly applied
- No - You must always assess (inspect) wing surfaces before takeoff. Again common sense & FAA reg.
- No - You must check visually first and assess conditions
- No - You must ensure the wing is clean
- No - You must evaluate all conditions i.e. time, temp, taxi time, type fluid used, etc.
- No - You must make sure of clean wings
- No - You should always evaluate each individual case for a safe takeoff
- No - You should check for clear ice accumulation
- No - You should check the wing or be able to go from the pad to takeoff roll ASP
- Inv. resp. - ????
- Inv. resp. - After as much of an exterior inspection as is possible, yes
- Inv. resp. - As of yet I have never used anti-icing with deicing we must perform a tactile before takeoff
- Inv. resp. - Conditions must always be assessed!
- Inv. resp. - Depends and we usually do that tactile test
- Inv. resp. - Depends on adhering precip
- Inv. resp. - Depends on how successful a visual inspection is
- Inv. resp. - Depends on surface/runway conditions, MEL/CDL items etc.
- Inv. resp. - Don't know
- Inv. resp. - Faith
- Inv. resp. - I am not familiarize with "HOT"
- Inv. resp. - I don't know what HOT limits are - according to management
- Inv. resp. - I will not takeoff in freezing drizzle or freezing rain
- Inv. resp. - I would have to review charts to make that determination
- Inv. resp. - I would not depart if they used Type I. Type II & IV have long enough HOT
- Inv. resp. - I'm not sure from memory - we have written checklists in all cockpits
- Inv. resp. - If the wing is clean - & the precip is light
- Inv. resp. - In the case of freezing drizzle and light freezing rain HOTs are so short. We have pre-travel checks each time
- Inv. resp. - Is this a test?
- Inv. resp. - It depends (**X 2 responses**)
- Inv. resp. - Look & see
- Inv. resp. - Maybe (**X 6 responses**)
- Inv. resp. - Maybe - possible - who knows? always an educated risk
- Inv. resp. - Maybe. Most assess several factors for each occurrence
- Inv. resp. - Most likely but not always
- Inv. resp. - My flight ops manual says "yes" - BUT I will still look at the wings to make the go/no go decision
- Inv. resp. - No necessarily (**X 2 responses**)
- Inv. resp. - Not always
- Inv. resp. - Not necessarily it depends on intensity
- Inv. resp. - Not necessarily-I refer to our manuals deicing section for permissive parameters-often we cannot depart if freezing rain persists!
- Inv. resp. - Our company ops manual prohibits operations in this type of weather
- Inv. resp. - Probably
- Inv. resp. - Probably yes, but that would depend on many factors
- Inv. resp. - There is never an absolute statement
- Inv. resp. - This is one of those dicey conditions-I prefer a tactile check within the 5 min. prior to T/O window
- Inv. resp. - Type of fluid?
- Inv. resp. - Unknown, HOT time for above precip usually to small to takeoff
- Inv. resp. - Usually
- Inv. resp. - Usually but I consider conditions on a case by case
- Inv. resp. - Usually so, but you always take all info available at the time, and if there's any question, re-inspect & deice
- Inv. resp. - Usually, if not why do we have HOT limits?
- Inv. resp. - Varies with intensity
- Inv. resp. - What are the field conditions? Can I even make it to the runway?
- Inv. resp. - What is a HOT limit?

Inv. resp. - Who knows?
 Inv. resp. - Would do a visual check

D9. Do you think ground de/anti-icing fluids provide any anti-icing protection in any of the following stages of flight?



[Invalid responses: 157 (10%)]

Comments:

- Takeoff run - + Taxi for takeoff
- Takeoff run - speed only
- Takeoff run - 100 kts or less
- Takeoff run - 1st 1000'
- Takeoff run - < 80 kts
- Takeoff run - After separation at speed - wing anti-ice
- Takeoff run - After shearing the only protection is shorter time for accumulation to occur
- Takeoff run - All fluid is gone by 100 kts
- Takeoff run - All is gone by 100 kts
- Takeoff run - As I understand it once we start moving the stuff shears off although some Type IV may stick. I doubt if it help much
- Takeoff run - At speeds near V, fluid is probably ineffective since it is flowing off the wings/aircraft
- Takeoff run - At very beginning, low airspeed
- Takeoff run - Beginning of T/O run prior to fluid shearing off wing
- Takeoff run - Below about 100 knots
- Takeoff run - Blows off during roll and all gone by int. climb
- Takeoff run - By after rotation most of the fluid is gone
- Takeoff run - By rotation, very little anti-ice fluid (Type II/IV) should remain on wing
- Takeoff run - Deicing fluid comes off during the takeoff run
- Takeoff run - Dissipates as speed increases
- Takeoff run - Don't really know but I doubt any protection is left above 80 kts on takeoff roll

- Takeoff run - During initial run probably while some fluid is still adhering
- Takeoff run - Early stage
- Takeoff run - First 1/2
- Takeoff run - First part of takeoff run
- Takeoff run - Fluid adhering to wing may provide some anti-ice protection until airflow eliminates
- Takeoff run - Fluid is to sheen off wing before liftoff - right
- Takeoff run - Fluid provides protection until fluid shearing speed is reached
- Takeoff run - Fluid runs off during takeoff run, most likely will last thru entire T/O run
- Takeoff run - Fluid will be blown off by lift-off
- Takeoff run - Fluids are mostly gone by lift-off
- Takeoff run - Fluids not certified airborne
- Takeoff run - For first 10 to 15 seconds only
- Takeoff run - Hopefully, then shed as advertised
- Takeoff run - I suspect the deicing fluid shears from a/c surfaces rather quickly!
- Takeoff run - I think most fluid has blown off by rotation
- Takeoff run - I think most of it is blown off by lift-off speed
- Takeoff run - Initial T/O roll
- Takeoff run - Initial T/O run
- Takeoff run - Initially
- Takeoff run - It blows off during T/O
- Takeoff run - It helps the wing stay clean these is blown off
- Takeoff run - It is supposed to shear off!
- Takeoff run - It shears off near rotation speed
- Takeoff run - It should be gone before rotation
- Takeoff run - It's all probably gone (i.e. removed by shearing action of the airflow) by initial climb
- Takeoff run - It's suppose to shear off at rotation speeds
- Takeoff run - It's supposed to shear during T/O
- Takeoff run - Little if any
- Takeoff run - Low speed only
- Takeoff run - May be limited on rotation, however should shear off before rotation
- Takeoff run - May be slight
- Takeoff run - Minimal
- Takeoff run - More studies to be published on this
- Takeoff run - Most blows off on T/O roll
- Takeoff run - Most/all fluid blows off during takeoff run
- Takeoff run - My understanding in that the fluid shear off during the takeoff run so that MOU is gone by liftoff
- Takeoff run - My understanding is that Type II/IV fluid shears during takeoff roll and any protection would be minimal prior to rotation
- Takeoff run - No, not generally
- Takeoff run - Not after "high speed"
- Takeoff run - Not long
- Takeoff run - On initial T/O run
- Takeoff run - Once airborne - only consider wing heat effective
- Takeoff run - Once rotation & lift-off occurs, I would assume that most if not all of the deicing fluid is gone
- Takeoff run - Only at lower speeds
- Takeoff run - Only initial run to approx. 80 kts
- Takeoff run - Only less than 60-80 kts

- Takeoff run - Only part of takeoff run, because fluids are blown off leading edge of wing
- Takeoff run - Only Type II & IV
- Takeoff run - Only until fluid shears
- Takeoff run - Per chance may be some residual at liftoff
- Takeoff run - Possibly early in T/O roll, but my understanding is anti-icing fluids begin to shear & lose their properties
- Takeoff run - Probably in the initial takeoff run only!
- Takeoff run - Provides same protection till it blows off the wing
- Takeoff run - Shear at 100 kts
- Takeoff run - Sheared off
- Takeoff run - Shears off @ rotation speed
- Takeoff run - Should be gone after takeoff run
- Takeoff run - Should be mostly shed by lift off
- Takeoff run - Should be shearing by rotation-liftoff
- Takeoff run - Should shear off <100 kts
- Takeoff run - Slight ability on takeoff run mostly
- Takeoff run - Some
- Takeoff run - Some had in freezing drizzle or rain
- Takeoff run - Supposed to shear off during t/o run
- Takeoff run - Takeoff run until they shear off the wing
- Takeoff run - The fluid can blow off
- Takeoff run - The fluid has normally dissipated (on critical areas) prior to rotation
- Takeoff run - The fluid sheds from the a/c
- Takeoff run - They are only good on ground within HOT
- Takeoff run - They may provide negligible protection during the initial takeoff roll but shear off during acceleration
- Takeoff run - Till it blows off
- Takeoff run - Till it shears
- Takeoff run - To certain speeds
- Takeoff run - To some degree
- Takeoff run - Type II shear
- Takeoff run - Type IV protects through lift off
- Takeoff run - Until blown off
- Takeoff run - Until fluid shears off
- Takeoff run - Until speed is such that precip does not land on top of wing
- Takeoff run - Until the fluid shears off it does provide some anti-ice protection
- Takeoff run - Up to about 100 kts
- Takeoff run - Up to about 100K, when they shear all the wing, is my understanding
- Takeoff run - Up to the sheer speed of the fluid
- Takeoff run - Up to ~80 kts
- Takeoff run - Up until it shears off
- Takeoff run - We turn on wing heat/engine. heat 800' AGL- I suspect there are few times one might experience some accretion between rotation and 800'-not significant to safety of flight
- Takeoff run - Yes with shearing off of Type II fluid
- Takeoff run - You can feel the heaviness of controls at rotation, but they "lighten up" quickly and I have noticed ice forming before 400' acceleration altitude
- Rotation-liftoff - 3-5 Don't know
- Rotation-liftoff - After fluid has sheared there is no protection
- Rotation-liftoff - After rotation, would expect little residual protection
- Rotation-liftoff - All our Type I/II/IV charts state they not provide ice protection during flight
- Rotation-liftoff - Anti-icing fluids only
- Rotation-liftoff - Benefit disappears along with fluid late in T/O run
- Rotation-liftoff - By this time, you've got the wings on 800
- Rotation-liftoff - Dependent upon icing conditions
- Rotation-liftoff - Depends on precip conditions
- Rotation-liftoff - Depends on situation
- Rotation-liftoff - Depends on the amount of precip
- Rotation-liftoff - Depends on the fluid, the Type IV's probably provide some minimal protection as they shear depending on precip intensity)
- Rotation-liftoff - Depends on type of fluid i.e. Type IV
- Rotation-liftoff - Fluid falls off shortly after becoming airborne
- Rotation-liftoff - Fluid takes a while to slide off. Have had Type II coating last 3 short legs!
- Rotation-liftoff - I doubt that once airborne deicing fluid can be of much effectiveness
- Rotation-liftoff - I feel that the fluid itself (esp. Type II) is an inhibitor to a clean wing
- Rotation-liftoff - I have heard comments from other pilots that the heavy fluids degrade takeoff performance as they "ripple" below the shear speed
- Rotation-liftoff - I'm sure it's better than nothing, but it must blowoff the leading edge quickly
- Rotation-liftoff - In no precip conditions
- Rotation-liftoff - It wears off as the aircraft accelerates
- Rotation-liftoff - Little or no effect after 100 kts
- Rotation-liftoff - Most of it will be gone by climb phase
- Rotation-liftoff - Normally Type II fluids would shear off prior to initial climb & a/c anti-ice would be on
- Rotation-liftoff - Not sure
- Rotation-liftoff - Obviously, the faster you go, the more sloughs off
- Rotation-liftoff - Once airborne, must rely on aircraft's deice system
- Rotation-liftoff - Once speed is up to normal climb then it is up to anti-ice systems since most fluid has blown off
- Rotation-liftoff - Only Type II or IV are effective till rotation sliding off the surfaces 4T 40 KTS to 130 KTS
- Rotation-liftoff - Possibly??
- Rotation-liftoff - Protection provided until all fluid has sheared from surface
- Rotation-liftoff - Protection to the point the fluid shears off
- Rotation-liftoff - Shears off after rotation
- Rotation-liftoff - Shears off at takeoff run
- Rotation-liftoff - Shedding of contamination
- Rotation-liftoff - Should shear off and remove accumulated snow /ice
- Rotation-liftoff - Some - but limited
- Rotation-liftoff - Some fluids have better adhesion so it depends on the fluid
- Rotation-liftoff - Supposedly they shear off during T/O
- Rotation-liftoff - The stuff is probably gone shortly after rotation

- Rotation-liftoff - They flow off the aircraft fairly quick after speed builds up
- Rotation-liftoff - Thixotropic fluids do
- Rotation-liftoff - Type II & IV
- Rotation-liftoff - Type II is so thick it still drips after a 3-hr flight
- Rotation-liftoff - Type II sheds
- Rotation-liftoff - Type IV
- Rotation-liftoff - Type IV
- Rotation-liftoff - Type IV fluid only
- Rotation-liftoff - Type IV may hold on slow speed/short leg, but others should shed on takeoff roll
- Rotation-liftoff - Type IV/ultra etc.
- Rotation-liftoff - Types II and IV only
- Rotation-liftoff - Until airflow shears fluid or until fluid saturation i.e. failure
- Rotation-liftoff - Until the fluid shears
- Rotation-liftoff - Video's of Type IV shear show such
- Rotation-liftoff - Yes, but constantly deteriorating
- Initial climb - 1st segment climb just after rotation
- Initial climb - A/C performance through 3rd segment does not degrade
- Initial climb - Above answers from Type IV experience
- Initial climb - Advanced fluid-for a short time
- Initial climb - After T/O I would think fluid is gone
- Initial climb - As it blows off
- Initial climb - As long as fluid is viscous on the airframe it will protect
- Initial climb - Decreasing with time
- Initial climb - Depends on fluid & precip
- Initial climb - Depends on speed, WX, and of flight
- Initial climb - Depends on type of fluid used
- Initial climb - Depends on
type/concentration/precip/elapsed time
- Initial climb - Due to slower speeds (turboprop)
- Initial climb - From lift off to 3 minutes after
- Initial climb - I feel deice fluid blows off quickly
- Initial climb - I feel it's gone after a few minutes of flying
- Initial climb - I have flown 500 miles and had fluid drip on me during the walkaround at the destination
- Initial climb - I have watched de/anti-fluid from cabin flow overwing surface. An adhere well into initial climb
- Initial climb - I've seen it (as a passenger) adhere to the wing
- Initial climb - Initial climb to min altitude for wing deice if needed
- Initial climb - Initial climb until wing anti-ice is turned on
- Initial climb - It seems Type II fluids have good capabilities for about 10 minutes after rotation
- Initial climb - Judging from the amount of dribble at the destination there may be some benefit inflight, but who knows how much
- Initial climb - Naturally, this depends on the type/viscosity of the fluid. Most are probably gone off wing by 80 knots
- Initial climb - Need to get heat on ASAP
- Initial climb - Never received info on fluid duration while airborne
- Initial climb - Not sure when fluid is completely failed.
Always follow procedures for wing & engine anti-ice
- Initial climb - Not sure. Just know if it's clean for takeoff, you're OK
- Initial climb - Not Type I or II but Type III & IV - yes
- Initial climb - On initial climb, there is still a layer of fluid on most every surface
- Initial climb - Once the fluid has sheared, there is no protection
- Initial climb - Probably shears off at or shortly after liftoff
- Initial climb - Protection fades as takeoff progresses
- Initial climb - Shortly after lift off all fluid should have blown off wing
- Initial climb - Should provide shearing action until it's mostly off surface
- Initial climb - Then I think speeds get to high & any residue fluid is gone
- Initial climb - Type II and IV may provide these protections
- Initial climb - Type IV
- Initial climb - Type IV fluid is sometimes still on a/c after landing at the destination airfield
- Initial climb - Type IV still occasionally drip from a/c upon arrival
- Initial climb - Until all has sheared off
- Initial climb - Until you can bring on anti-ice measures
- Initial climb - Up to about 5-800' dep on A/S
- Initial climb - We're pilots, we suspect protection - is it??
- Initial climb - Yes as indicated until air for A/I can be selected on at or after cleanup - 2nd segment
- Initial climb - use of the word "any" makes this question very impractical; therefore I answer as I do. Some though very little is initially provided in ops
- Final climb - Depends upon type of precipitation
- Final climb - Type IV is excellent
- Final climb - Yes, I've seen Type IV dripping after we landed ONLY TYPE IV
- Cruise - Different degrees
- Cruise - Have seen fluid dripping at destination
- Cruise - I have arrived at my destination 2+hrs later and still have deice fluid dripping from the wing
- Cruise - Only residual fluid offers protection - how much is left on the surfaces?
- Cruise - Type IV seems to last a long time
- Inv. resp. - All - have flown from DTW-SAN, handed to - aircraft still covered with fluid
- Inv. resp. - Don't know (**X 3 responses**)
- Inv. resp. - Don't know - probably during takeoff & rotation
- Inv. resp. - Fluid sheds on takeoff run, won't protect leading edges
- Inv. resp. - Fluid shears off on takeoff run
- Inv. resp. - I believe fluids offer no protection after beginning of takeoff run
- Inv. resp. - I feel that, once the takeoff run starts and the fluid starts to shear off, we are "airborne" and airborne procedures need to be used (per flt manual)
- Inv. resp. - I think of it as deice NOT anti-ice and I treat it like that
- Inv. resp. - It's supposed to shear off during T/O roll - i.e. can't T/O with anything adhering to the wing?
- Inv. resp. - Most of it is supposed to roll/blow off by rotation

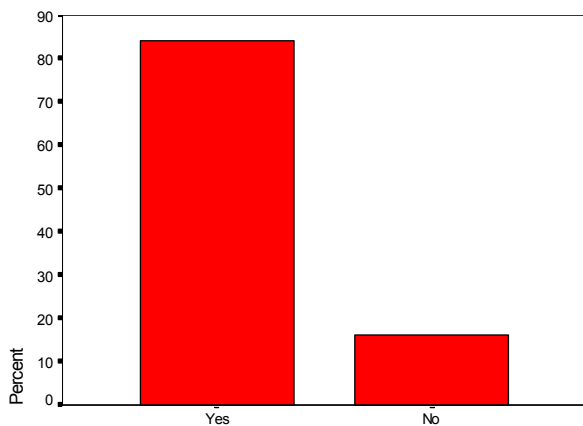
- Inv. resp. - Most of the fluid runs off of the surface. If any protection it's minimal
- Inv. resp. - Mostly sheared of on T/O roll
- Inv. resp. - No (**X 9 responses**)
- Inv. resp. - No - not at all
- Inv. resp. - No - on the ground only
- Inv. resp. - No - only while on the ground when ice will build on all surfaces
- Inv. resp. - No because ice prone edges are usually the first to shear
- Inv. resp. - No protection (**X 3 responses**)
- Inv. resp. - No significant protection for new ice after T/O roll
- Inv. resp. - No! In fact, using Type I in dry light snow could make the plane more dangerous than just letting the snow blow off
- Inv. resp. - None (**X 5 responses**)
- Inv. resp. - None for anti
- Inv. resp. - None of the above
- Inv. resp. - None, particularly after the fluids shear off the wing
- Inv. resp. - Not really. Once you're under way the fluid is HISTORY. the ONLY anti-ice protection is from ENGINE HEAT BLEED
- Inv. resp. - Once the fluid begins to shear off the a/c I assume the fluid no longer provides any protection
- Inv. resp. - Only taxi
- Inv. resp. - Only taxi protection
- Inv. resp. - Shear of the fluid is a variable
- Inv. resp. - Start of T/O run only
- Inv. resp. - The short time of the T/O roll is insignificant, and the fluid should shear off
- Inv. resp. - Who cares-I don't takeoff unless clean at once in flight I have anti-ice

[Invalid responses: 99 (6%)]

Comments:

- Yes - "Light" is keyword
- Yes - (FAA approved) This is a joke!
- Yes - 5 min. HOT
- Yes - 5 mins to HOT time
- Yes - Although a/c not certificated, this is short transition time
- Yes - As long as aircraft adheres to holdover times
- Yes - As previously stated, impossible with Type I
- Yes - As stated. Anything worse - no go
- Yes - Both
- Yes - But a very low holdover time (<5 mins)
- Yes - But as a matter of policy we do not takeoff in ZL or ZR
- Yes - But holdover very limited
- Yes - But only 5 min. HOT
- Yes - But only light
- Yes - Can't be past HOT (almost impossible)
- Yes - Can't do it
- Yes - Certain conditions must be met
- Yes - Co. prohibits TO in greater than mod freezing rain
- Yes - FAR 121.629
- Yes - Freezing drizzle only
- Yes - HOT is listed. But, use at own risk!
- Yes - HOT is real low 5 min
- Yes - Holdover chart (**X 2 responses**)
- Yes - Holdover time is extremely short - we suspend operations
- Yes - I am more conservative with my operating decisions
- Yes - I am skeptical of this, I assess the conditions and decide whether to go or wait
- Yes - I believe so
- Yes - I do not depart in such conditions
- Yes - I don't like, all we us is Type I
- Yes - I think it specifies no T/O
- Yes - I think so
- Yes - I'm not sure
- Yes - If properly deiced
- Yes - If within the HOT guidelines
- Yes - In this situation-deicing should be accomplished when #1 for T/O & then go. No taxiing permitted for safety sake
- Yes - It's incorporated in our flight ops manual
- Yes - It's unsafe!! Ice can be invisible
- Yes - Just HOT chart & notes
- Yes - Light FZ Rain/MOD FZ Drizzle
- Yes - Light-MOD freezing drizzle
- Yes - Light
- Yes - Light OK, freezing rain, NO
- Yes - Light only
- Yes - Light to mod frz drzl or light frz rain OK
- Yes - MOT ZR or heavy ZL = No operation
- Yes - Must be within HOT!
- Yes - Must still meet HOT requirements
- Yes - My flight ops manual says "yes" - BUT I will still look at the wings to make the go/no go decision
- Yes - No T/O in moderate ZR or ZRD

D10. Does your company publish FAA approved Operations Specifications for the aircraft you fly which allow takeoff in light freezing rain and/or freezing drizzle?

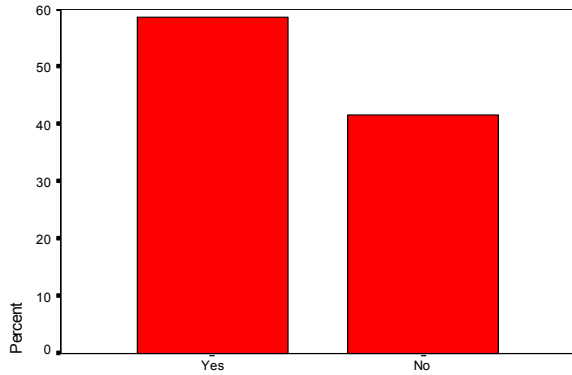


Company publishes approved specs which allows aircraft to takeoff in Ff

- Yes - No ops in severe icing conditions
 Yes - No restriction
 Yes - No severe icing ops approved
 Yes - No takeoff in greater than light freezing rain/drizzle
 Yes - No takeoffs
 Yes - Not "heavy"
 Yes - Not allowed if holdover time expired
 Yes - Not authorized to T/O
 Yes - Not heavy freezing drizzle
 Yes - Not in ops specs but is in GOM
 Yes - Not real specific though
 Yes - OK to go
 Yes - On ops in mod/heavy FZ rain or heavy FZ drizzle
 Yes - Only LIGHT not mod or heavy
 Yes - Only at certain temp (OAT)
 Yes - Only if tactile test is performed
 Yes - Only light if within HOT
 Yes - Our company has significantly reduced its concerns about flying in rain since the 4184 accident
 Yes - Part of HOT
 Yes - Prohibited in mod/heavy frz rain, mod frz drizzle
 Yes - Publish specifically prohibited conditions
 Yes - Ridiculous-in STL you wait far past your HOT before T/O then you're all iced up
 Yes - STUPID!!!
 Yes - Takeoff is almost always deferred anyway
 Yes - The ATR can only depart in these conditions with a tactile test, we cannot get
 Yes - The company actually approves this as long as HOT is not exceeded and there are 0 precip of severe ice
 Yes - The keyword is light
 Yes - They also leave a lot of questions
 Yes - They are just HOT's and VERY short times
 Yes - They're rather generic
 Yes - Type II and IV is useable. Type I is ineffective
 Yes - Up to MOD freezing drizzle
 Yes - Very restrictive limits
 Yes - Very short HOT though
 Yes - Very short HOT's
 Yes - Very short HOT, often makes operation impractical even though published
 Yes - Very specific guidelines
 Yes - We can do it
 Yes - We have a laminated ground deice/anti-ice condensed guide
 Yes - We have on occasion shut down the operations during these conditions
 Yes - We must determine level i.e.: moderate/heavy
 Yes - Why does the FAA allow us to do this since freezing rain & freezing drizzle are outside of the certification envelope?
 Yes - With deicing
 Yes - Within HOT. Prohibited outside of HOT
 Yes - Yes op specs allow T/O in non-heavy freezing drizzle and light freezing rain
 Yes - Yes, but Type II is required
 Yes - and check visually
 No - But documents in cockpit lead many to believe it's approved
 No - But they do provide holdover times
- No - Co. often times pressure crews to T/O in above conditions
 No - Don't know
 No - FR & FD not authorized
 No - I don't believe so
 No - I don't think so. Just a holdover
 No - It's not specifically addressed
 No - Just the "approved NWA deice plan"
 No - Light to moderate freezing drizzle
 No - My interpretation is that freezing drizzle is prohibited
 No - Not allowed to takeoff (**X 3 responses**)
 No - Not for specific aircraft
 No - Not in the ops specs, but in the GOM
 No - Not sure
 No - Not to my knowledge
 No - Not without deicing/anti-icing
 No - Other than clutter reductions for to GW
 No - Overall deice card provided for all a/c types
 No - Prohibited
 No - They only say we can (that's it)
 No - They try and make us fly in it
 No - Unaware of any aircraft approved for such?
 No - We do have a specific procedure in our ops manual but not in the ops specs
 No - We don't do it
 No - We fly anyway though
 Inv. resp. - Don't know (**X 5 responses**)
 Inv. resp. - Exemption
 Inv. resp. - I do not have the info handy now
 Inv. resp. - I'd have to check, but I think not
 Inv. resp. - It publishes recommendations
 Inv. resp. - Manual contradicts itself. In one place it allows it, in another it doesn't!
 Inv. resp. - Not allowed
 Inv. resp. - Not aware of any
 Inv. resp. - Not on prohibited list, but not specifically approved either
 Inv. resp. - Not sure (**X 3 responses**)
 Inv. resp. - Our company manual, which is FAA approved, states that it is allowed
 Inv. resp. - Really don't know
 Inv. resp. - There is something printed, can't recall if this is approved
 Inv. resp. - Think so, but would have to look it up
 Inv. resp. - To my knowledge it is not covered in the ops specs. The only reference is in the flight ops manual prohibiting T/O with heavy FZ rain or drizzle
 Inv. resp. - Would have to consult FOM
 Inv. resp. - Would have to look at our card - I haven't memorized it-doubt it says freezing drizzle is OK

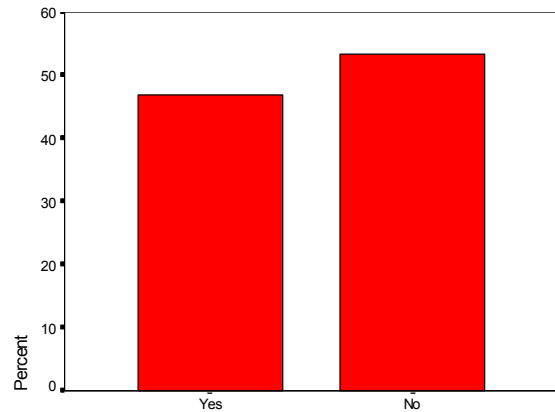
D11. Does your company publish information for use to determine precipitation intensity (for example, relating visibility in precipitation to precipitation intensity) for:

(a) Snowfall



Company publishes info to determine precip. intensity for snowfall, eg.

[Invalid responses: 72 (5%)]



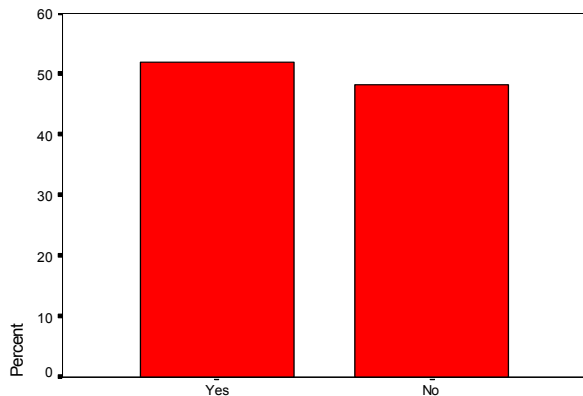
Company authorizes use of personal obs of FRDZ to supersede current

[Invalid responses: 173 (11%)]

Comments:

- Yes - "Exercise good judgment"
- Yes - . Northwest does an excellent job in this area. We have purchased many new deicing truck in the last two years. The only real problem in some (not all) out stations still use only Type I.
- Yes - A visual check is the only approved method to determine if wings are clean
- Yes - Again, do not attempt to legislate common sense
- Yes - But I'm not sure
- Yes - But my authority is to say tail is MORE than LIGHT
- Yes - But only more restrictive than the observation
- Yes - But this is constantly debated by our POI
- Yes - But we use weather observations first, then our own after that
- Yes - Cabin look only
- Yes - Capt. has final say
- Yes - Capt. judgment
- Yes - Captain's discretion (**X 3 responses**)
- Yes - Captain has final decision (in principle)
- Yes - Captain has some latitude
- Yes - Captain is ultimately responsible
- Yes - Captain's authority
- Yes - Captain's authority holds
- Yes - Captains' authority
- Yes - Chief pilot told me "pilots are WX observers" & if we feel it is not freezing rain when the says it is, the it isn't"
- Yes - Clean aircraft can takeoff
- Yes - Common sense must prevail
- Yes - Common sense says I'll always use it if need be!
- Yes - Company authorization is not the issue, it is always "captain" decision
- Yes - Company manual is not specific, about this item
- Yes - Crew is ultimately responsible
- Yes - Dispatch & supervisory pressure to make flight out on time
- Yes - End of runway can be a long ways from central field point/tower, etc.

(b) Freezing drizzle



Company publishes info to determine precip. intensity for freezing drizz

[Invalid responses: 89 (6%)]

D12. Does your company authorize you to use a personal observation of light freezing rain and/or drizzle to supersede a current weather observation?

- Yes - For worse than reported
- Yes - Go-NO GO decision is in the cockpit here, these observations are crucial
- Yes - I am the final authority and the company (thankfully) does not second guess our safety judgments
- Yes - I believe so, we have the authority to inform dispatch and work out a plan from there
- Yes - I can decrease the observation
- Yes - I don't care if they do or not. If I don't feel safe, I don't fly!
- Yes - I think so
- Yes - I think that it's ridiculous. I'm not a weather man
- Yes - I think the potential for a solid deicing program exists at our company it's just that anytime the weather goes down there seems to be a flood of confusion on what to do, when to do it, and who's going t
- Yes - I'm not sure on this one but I use what I see out the window; not what a weather man things, he isn't going flying
- Yes - If most current WX report differs from actual conditions
- Yes - If not report, but observed
- Yes - If official observation is not timely
- Yes - If weather is much worse than reported we would use it
- Yes - If worse, usually
- Yes - In conjunction with dispatch
- Yes - In conjunction with dispatcher etc.
- Yes - It's a Captain "call"
- Yes - It's a real hard call - improve deicing fluid & improve ability to detect icing
- Yes - It's unsafe!! Ice can be invisible
- Yes - Many times the current observation is not accurate
- Yes - Not addressed in these terms - we assess wing condition
- Yes - Not sure (**X 2 responses**)
- Yes - Of course
- Yes - Only if it is more conservative such as the ATIS not calling any freezing precip
- Yes - Only if my observed condition is WORSE
- Yes - Only on the conservative side
- Yes - Only when precip is less than in the WX observation
- Yes - Our pilots always have last word
- Yes - PIC decides
- Yes - PIC is PIC
- Yes - Particularly when conditions are changing rapidly
- Yes - Pilot must determine whether operations can be conducted safely
- Yes - SCD
- Yes - Since WX changes so rapidly, it would be foolhardy to use recorded WX obsv. vs looking out the window
- Yes - Sometimes-if the Capt. raises a big enough stink Co. usually goes along with Capt. although sometimes with loss of pay
- Yes - Suppose to use "best judgment"
- Yes - Takeoff permitted in light freezing rain or drizzle
- Yes - That is at the discretion of crew if WX observation calls for light freezing rain, but in crew's opinion it is more than light ten you do not fly
- Yes - The PIC always has the final say!
- Yes - There is nothing written as such but we are allowed to be conservative
- Yes - They better!!
- Yes - They leave it up to the pilots as far as I know. In conjunction with dispatch
- Yes - They only tell us to have anti-ice on when visibility is below 1 mile in precipitation
- Yes - To supersede ATIS if conditions have changed since broadcast time
- Yes - Under certain circumstances
- Yes - Under limited conditions
- Yes - Use most conservative
- Yes - Use whichever is worse
- Yes - Very unclear in this area-as long as there are no problems there are no problems
- Yes - Very vague verbiage
- Yes - Visible moisture (YES) less than 1 mile
- Yes - We (pilots) make the decision
- Yes - We can always in the name of safety refuse to go
- Yes - When I insist!
- Yes - Yes
- Yes - Yes PIC judgment final word
- Yes - Yes they always want to get the flight out and I am not comfortable superseding a WX observation. I am not trained to do that
- Yes - Yes, but it is so vague that I doubt if 99% of pilots understand it. If the personnel observation is more conservative
- Yes - You're the Capt. - when in doubt, don't go
- Yes - Your observation may be more conservative than WX observation
- Yes - and I do
- No - 2
- No - ATIS/AWOS measure of precip. rate and charts based on exact average rates per short time periods (perhaps mm/a/minute) would go a long way toward improving "LT/MDT/HVY", while affixing exact HOTs to rates rather than ranges.
- No - Again, many believe otherwise as it's not spelled out on cockpit documents
- No - But Captains judgment can prevail
- No - But as Capt. it's my call!
- No - Captain must coordinate with dispatcher
- No - Don't know (**X 2 responses**)
- No - Don't know - not specified in FOM
- No - Don't know, use ATIS
- No - Don't really know - never addressed but PIC is always final "safety checker"
- No - Don't think so
- No - Good thing
- No - However, if our personal obs is more restrictive we have the right to doubt is necessary
- No - I have seen situation where ATIS is giving a report of snow or drizzle and we feel somewhat frustrated when there isn't any-i.e. if T/O & something were to happen-it "was reported as .." when in fact it wasn't. A lot of common sense discretion has been taken away from the pilot, but that is probably good.
- No - I would only use ATIS anyway so there are no questions

- No - I'd like to see the determination made by the flight crew for the precip type at our location on apt at that time. Not the hourly WX sequence
- No - If rain has stopped & ATIS is still reporting freezing rain, then yes
- No - If they do they don't advertise it.
- No - In general crews do not do this despite being authorized
- No - In line operations it always boils down to intensity observed by crew
- No - It should
- No - Mostly Captain's call
- No - Never mentioned, but that's what "Captains authority" is all about
- No - No I think, I use only what's on ATIS, that's recorded and I hope unbiased
- No - No such practice exists for our company
- No - Not that I am aware of (X 5 responses)
- No - Not that I am aware of. Personally, I wouldn't supersede a WX report
- No - Not that I know
- No - Not to my knowledge (X 2 responses)
- No - Official observation
- No - Official observation rules
- No - Only to augment current weather observations
- No - Only to be more conservative
- No - Our airline should do this
- No - Really need one
- No - Reported would be official word, but if I didn't feel we should go, we wouldn't, no questions asked
- No - See C7
- No - The final say is up to the Captain but there would be repercussions
- No - They go with approved WX obs
- No - They should!
- No - They should. Light is a broad definition
- No - This would be a bad idea
- No - Unless personal observation is more restrictive
- No - Unsure
- No - Unsure - we are confused
- No - Use ATIS
- No - We can't override official WX reports
- No - We use official reports - I suppose if I was at a remote station I would make it if no one else did
- No - Would be foolish to do so
- Inv. resp. - ?
- Inv. resp. - Captain's authority?
- Inv. resp. - Common sense dictates action
- Inv. resp. - Doesn't address specifically
- Inv. resp. - Doesn't matter, I trust MY judgment more than a company lawyer's judgment
- Inv. resp. - Don't know (X 12 responses)
- Inv. resp. - Don't know for sure
- Inv. resp. - Don't know. I go by current field conditions
- Inv. resp. - Don't recall, but I would not do it
- Inv. resp. - Final authority is up to Captain
- Inv. resp. - Get real! Actual conditions
- Inv. resp. - Grey area, not sure
- Inv. resp. - Have to look it up
- Inv. resp. - Haven't tried - don't know
- Inv. resp. - Honestly, I'm not sure. I go with what's on the ATIS
- Inv. resp. - I assume the privilege of declaring worse conditions but not better conditions
- Inv. resp. - I do not know (X 3 responses)
- Inv. resp. - I do not remember
- Inv. resp. - I don't think so
- Inv. resp. - I feel it is no problem to exercise my authority to the more restrictive side. I would get a new current WX observation to go from freezing rain to - freezing rain
- Inv. resp. - In addition too
- Inv. resp. - My authority to deice
- Inv. resp. - No
- Inv. resp. - No guidance provided
- Inv. resp. - Not aware of any. Only in conservative direction i.e. I think it is heavier than observed
- Inv. resp. - Not certain
- Inv. resp. - Not stated but I assume so
- Inv. resp. - Not sure /Unsure (X 10 responses)
- Inv. resp. - Not sure - but I believe so
- Inv. resp. - Not sure - we look up deicing procedures whenever we have to use them
- Inv. resp. - Not sure how to interpret
- Inv. resp. - Not sure, but do anyway
- Inv. resp. - Not sure, but think so.
- Inv. resp. - Not sure-have to read book again
- Inv. resp. - Not that I am aware of
- Inv. resp. - Of what, none or mod or heavy?
- Inv. resp. - Only if we are being more conservative than the weather report
- Inv. resp. - SCD
- Inv. resp. - Unaware
- Inv. resp. - Unknown (X 6 responses)
- Inv. resp. - Unsure (X 4 responses)
- Inv. resp. - Would use worse case

D13. Do you have any general comments on devices, training and/or procedures to improve safety in icing conditions.

- Require airports to set up "car washes" at the runway. Also, have mechanics or trained personnel at #1 position to do a hands on check
- Airline/FAA supervision of those responsible for deicing/anti-icing must be more frequent and strict
- Place car wash type operations at or near runway. The best de/anti-ice facility is adjacent to 28R at PIT. This type ops should be at every airport with air carrier ops. P.S. I don't work for U.S. Air
- Do it at end of runway
- Overall, FAA has made lot of commotion to keep public happy. Think in the past pilots deiced accordingly. FAA really hasn't changed that much for us but it sure sounds like it. Airlines do what is required by law (FAR's) & that's all. Safety costs money & feel that they don't want to spend a penny more than forced to. Just look at how insane the rest requirements are, after NTSB states how much fatigue has a play in A/C

accidents. Still no change here. It really comes down to a big political lobbying game in Washington DC.

More ground support for the determination of wing & surface condition. Standardized communication throughout FAA/ICAO, company, airports, etc.

Deice/anti-ice should be conducted as close as possible to T/O time.

Ideally, anti-icing should be accomplished within 5 minutes of T/O. Then, trained personnel outside the aircraft in a well lit area can assess the critical surfaces and you depart. Failing that, establish a "last chance" checkpoint near the runway with outside personnel trained to recognize fluid failure

Videos of types of icing, fluid failures, wind tunnels with icing

For severe conditions: gate deicing prior to push back, with a quick reshoot in a common area just prior to taking runway

Current procedures appear effective. This has been the single greatest improvement in aviation safety in the last twenty years

Deice at the end of the R/W just prior to T/O

New fluids are great. Awareness of problems much better training very sub par

External inspections are needed. Also meter departures to allow minimum ground time after deice

You do it so seldom it is difficult to attain expertise in our type operation

A film showing animated demonstration of Type II fluid shedding wing ice on takeoff would be helpful

Departure end deicing as a standard at all airports

Deice just before T/O and not at gate. Deicing performed twice at gate when not needed this winter

e location we contract out deicing to other companies which cause some problems. We have come a long way in the last few years

The only comment I have is that it is difficult to understand how new airports constructed this day & age do not provide deicing pads at the departure end of every runway

Should incorporate better procedure during annual (SVT) recurrent training

The pictures or films you mentioned earlier about breakdown would be nice

On a cold soaked a/c with powder dry snow fluid should not be used it should be brushed off or blown off with air. Fluid can run down into places and freeze

We used to takeoff with 2 inches of snow on the wing as normal. Certain a/c this is deadly. These a/c i.e. DC9-10 need to be identified and dealt with differently. In typical FAA/lawyer fashion we have gone

ATC (ground control) needs to be more sensitive concerning taxi times and who has a greater need for right of way if there is a conflict with ground traffic. A/c taxiing out of deice should be given priority over a/c taxiing into deice. They don't seem to have a grasp of holdover times, type of fluid used that particular say, and the precip on ATIS

Companies must be required to let the pilot make the call and back their decision if it errs to safety no questions

asked ever!!! Completion factor shouldn't be their motivator - safety 1st!!

Training is good. I think we error on the side of safety but that's good also. Would like to see new technologies come on line (i.e. infrared heating). At my airline a trained ground person is the one who determines if deice/re-deice is necessary. Captains must obey him as his word is law

I am more concerned about runway conditions than aircraft conditions. At our airline, the aircraft always leaves the deicing area in excellent shape for takeoff

Again the most important step in safety is going to be a better way of telling fluid contamination. Even though better training for ground personnel, and better info on water content vs holdover time vs OAT, could be helpful they are not of much use in final determination of wing contamination and we have not even touched the tail, which in most large a/c is not able to be deiced in flight or seen on the ground at night.

Our training and procedures are excellent. I'm sure that everyone would prefer an operation similar to Paris CDG & taxi through deice and then takeoff immediately

As mentioned earlier - As part of the process we as pilots should be provided with fluid break-down info. I have not been and I work for a large airline. However I will inquire about pictures of fluid failure

Many airports I'm at are spending millions to "look pretty". Not one has a place for, or will allow, deicing at the end of the runway so we would get the best use of the fluid

The only way to ensure maximum safety is to have personnel check every a/c immediately prior to takeoff

Videos. Demos. Automatic measures of effectiveness

The more standardization the better. It has only been recently that I have seen continuity among stations

Good follow-up programs that identify problem areas during winter operations will consistently improve procedures for the ground crews as well as cockpit crews

Car wash at end of runway operated by airport (not airlines) with recycle capability

Training videos viewed during recurrent training. Changes this year to fluids/deicing procedures - but last video viewed was from previous season - (not sure of video was updated this season)

Teach conservatism and get management to buy into program before you teach it - stories of pilots being second-guessed on a decision to deice can destroy the program's discipline

More standardization and education on fluid types, holdover times, and precip. intensity

Our biggest problem is the moron's we employ who don't care, want out of that cold cherry picker, and don't know what they're doing

Rotate very slowly and do not push the operating envelope whenever icing is a problem. Indicating system would be very helpful. Automating use of anti-ice system should be considered

Training, dedication and capability of ground crews is my biggest concern

The best defense against taking off unsafely in icing conditions is for the company to back their pilots' decisions about not going-delaying or canceling. This is more easily done in the major airlines than in the commuters or supplemental carriers. These entities seem to push their people to be "company people" by constantly pushing the limits of their skills & testing nature

More training for pilots

Must have engine running "car wash" deice - through procedure for most efficient effect. Deice and takeoff immediately - no delay allowed after deice

Deicing aircraft as close to departure runway as possible (PIT, DEN) seems to work the best

To be perfect, let's all deice at the hold short line or as close as possible to it. Post-deice a/c should have runway priority over any aircraft, including landing traffic

De/anti-icing application at central location close to takeoff point in conjunction with controlled departure times very beneficial

How did we ever manage to fly before the Air Florida Debacle at DCA??

What happen to de/anti-icing at the end of the runway? EPA I bet!!

Do it close to takeoff in both time and location. Have end of runway touchup

My company procedures generally well received. See comments to various questions herein. Await possible automatic detection device for anti-icing fluid breakdown

I have never understood why we deice at the gate only to wait in icing conditions (sometimes for extended periods) to takeoff. The US Air F-100 crew who ended up in flushing bay a few years back were forced to make decision none of us should have to make. After taxiing for 50 min to an hr. with 50 plus a/c behind you, do you go back to deice again? Only to be in line for another hr., or do you go? If everyone returns to the gate for deicing nobody ever gets airborne. One of two things must change. We should de-ice at the departure end of the runway when you are No. 3 for take-off or ATC must upgrade hardware/software to allow more aircraft into the air during times of poor WX. Also ATC could assign dept. time windows ± 5 min. so we can de-ice at the gate, taxi to dept. runway and take-off with minimal delay. Putting crews in a position of returning to the gate or taking off after 50-60 min. Taxi's in icing conditions is unacceptable! Thank you for this forum to be heard.

Type II, Type IV fluids are a great improvement

Overall much improvement over last two years. Smaller stations with contract personnel still need some work - especially in area of communication

Better lighting during night operations to view critical surfaces

This was the warmest winter on record for most of the US so this year probably wasn't the best year to pick for this survey

Deice in a flow through sequence-automated spray or for a/c type & have supervisor to observe thoroughness-a/c does not stop moving

Closer to takeoff runways for de/anti-icing proc. More "visual" info to crews - i.e. video/pictures

Many times we deice when it's not necessary. Everyone is trying to fly the aircraft their way and the pilots are just along for the ride

The use of Type IV fluid and the holdover time guidelines has made a big improvement in the safety of operating in icing conditions. The requirement of a visual check, from inside the aircraft, by a flight deck crew member, just prior to takeoff, is a joke!! During the day, some useful information can be gained by this procedure; but during the night, this procedure has more effect on the emotional status of the passengers, than on the flight deck crew member's knowledge of icing effects. The reason this visual inspection is so worthless, especially at night, is simply because there is not enough light. A professionally done deice/anti-ice procedure followed by the use of holdover times is far and away more effective. However, we still do not have definite guidelines as to how to identify light/moderate/heavy precipitation. This makes the holdover time method a guess at best. The best procedure is still a very awkward one to accomplish: Visual and touch inspection by a qualified individual just prior to takeoff; in short, somebody standing out on the taxiway at the end of the runway checking out airplane wings. Until this, or a better procedure is implemented, I do not advocate eliminating the above procedure which I have ridiculed. It is better than nothing.

There is no doubt we have come a long way for the better in deicing procedures, but again we have done little overkill (bad term) in past few years in deicing every a/c in non-icing conditions or a/c that are clear of snow/ice. I don't want to go back the way it was but maybe us pilots can have more say into deicing our a/c in questionable circumstances or let up on airlines and let them & their crews decide when not to deice.

Yes need to address freezing rain issues. I believe that this is a strong safety concern

Utilize well-trained ground crew that actually follow through all procedures

Deicing/ice check done along the taxi route to the t/o runway when you are no less than #3 for t/o

Establish deicing at runway just prior to takeoff

Required physical check of aircraft by ground person provided by the airport or airline. This person should be trained and highly qualified to perform this check.

If routine de/anti-icing procedures were accomplished at runway end, no takeoff icing problems would exist.

Have a deicing facility available for all operations and send bill to each airline for type a/c,

Good survey - shows lots of gaps in training

If we can have logo lights, why not wing lights?

Would be better (for me) than some sensor system

I think that training and procedures are pretty good and getting better with the advent of newer fluids. An electronic sensor to detect breakdown of protection would be a huge help-judging conditions from inside

- the cabin is very subjective and depends a great deal on external conditions and on the person doing the inspection
- If you are going to safely deice an aircraft then it needs to be near the takeoff point and done right before takeoff.
- Few airports have this capability
- A 2 to 3 day ground school dedicated to the procedures for deicing, studying types of icing situations, accidents, fluid types, etc.
- I send this questionnaire reluctantly as it is filled with imprecise data and answers to general questions that have possibilities of many variations of great impact on my final determination of whether or not to go
- Type IV needs more testing - I have had several times when the aircraft would not rotate at the VR speed
- Get more drive thru's right at departure area
- Videos would seem to be the medium for use here - show me failed fluid - is that possible?
- My airline is doing as well as possible
- Adequate external lighting wherever assessment of icing conditions are required
- Common sense is the most important factor in operating in icing conditions. Improved fluids, procedures, and devices are important as well, but proper evaluation of anti/deice results and assessment of current weather conditions is primary
- Again-I believe that airports/airlines should establish a collective system at the departure end of each runway. This would insure that aircraft are adequately deiced just prior to takeoff. Airlines should create committee to oversee/establish a program-manned by rotating crews based on usage
- Ground personnel need to know procedures & importance of thorough deicing - our company had 2 incidents this winter involving inadequate tail deicing very serious - only training of flight crew prevented
- My biggest complaint is we have separate checklists for deicing in general in the aircraft then have to pull out the operating manual to configure for deicing. Requires books all over the place. Would like ONE aircraft specific checklist to do the whole deice procedure
- Deicing at the end of the runway
- Deice at end of runway (pad) then after deicing clear for immediate T/O; gate deicing with active precip should be abolished
- A good powerful light from fuselage toward the wing tip, illuminating the top of the wing would help determine when deicing fluid has failed
- Feel an enclosed for the guy doing the actual deicing should be mandatory
- Deice aircraft at the departure runway!
- Keep APV's working. Too many aircraft with APV's insp. this year. Use Type IV more. Do not park deicing trucks until Memorial Day DTW/MSP. Run APV on overnight aircraft. Provide brooms for once a year snowfall in MEM. Provide visual inspection truck before remote sites at gate or enroute to remote
- This whole procedure is too complicated to be useful to the pilot. It is a CYA procedure for management and Gov't Agencies. To be really effective, deicing should be done at takeoff end of runway, just prior to going into position, such as at Munich and Paris
- Not familiar with sensor system but sounds like it has possibilities - do feel black sections of leading edge of wings would enhance observations on ground and air
- I have deicing crew do a state to pilots that an inspection was done & how surfaces look, de/anti-ice top of tail on older Boeing aircraft. Replace over-wing windows that are used for end of runway inspection, possibly treat such windows so that de/anti-icing fluid runs off to allow better inspection
- Deice aircraft as close to departure runway and actual takeoff as possible
- Training does not equal experience but lacking experience training seems the next best thing
- I feel our training and procedures are more than adequate
- No I'm not very smart. I just follow what I get taught
- Deicing responsibility. belongs to the pilots and pilots alone. We are in the aircraft, everyone else is left on the ground when we T/O
- Have "qualified" inspectors at deicing pads near T/O runway. They are the only ones that can visually inspect the aircraft. Inspecting aircraft from inside is just a "guess"! (Windows covered with deicing fluids, precipitation at time of inspection, dull/glossy fluids - hard to tell - door lighting, etc.)
- Improve knowledge and professionalism of deicing crews
- No takeoffs should be allowed in any freezing drizzle or rain, period
- Keep it simple. We don't want to forget more than we learned
- FAA guidelines for light/MOD precip. conditions per question D11
- Use actual demo for fluid failure to see what is normal when fluid fails or provide video of fluid failure demo
- I feel ALL deicing and anti-icing should be done as close to the takeoff runway as possible. Also, ALL pre-takeoff contamination checks should be done by highly qualified company personnel and not the flight crew. This should be hands on outside the aircraft. This should be MANDATORY at night when HOT has expired or precip. rate is moderate or greater. Daytime operations could be less inspected by flight crew or by ground personnel when requested. Also, there should be no penalty or "lose your take-off slot" when requesting a hands on check. The aircraft should only pull off in a hold area and get right back in sequence when ready. Tower controllers should be briefed on this.
- There needs to be a greater awareness and education of types of ice and how to use our anti-ice equipment effectively
- Build designated deicing or at least a final squirt area at busy airports where holdover time becomes a problem due to volume of traffic. Take some lessons from European carriers
- I have a positive feeling about progress made in recent years though I know many changes were forced by accidents. Hopefully, future changes such as sensors on wing will happen without further loss of life

No matter what you do, if you have a problem - the FAA "will nail you" for something. You have to just do the best you can

Airline aircraft and after taxi inspection are not compatible from the cockpit or leaving the c/p to look thru cabin windows. The only way is to be outside and have access to what's there and what's happening climatically, pre-push (blk out)/..... deice we only reasonably confident areas to consider

Setup deice pads at the holding point for the takeoff runway!!!

Deice at departure end of runway at ALL airports!

Specific airports do not allow efficient deice operations. It should be done close to runway "car wash" style. Reference CDG setup in Paris - excellent operation - though not often needed!

Deice at end of runway. Video camera for cockpit

Our deice holdover charts say (moderate/light) in the fluid categories, yet in the weather conditions category it has "light freezing drizzle" and "light freezing drizzle" doesn't make sense!

By far, the inability to actually determine whether fluid failure has occurred, is my most uncomfortable regime of winter precip/deice ops. Looking through a pax window that has deice fluid on it, in the

Our company has a good training program for deicing. Most of us pilot are pretty conservative on this subject. If in doubt, deice. The system works good! I think the visual inspection is the best defense, for making a determination. Detection devices may add to the safety of the program, as long as they work properly and don't give false signals

We need drive through de/anti-icing at the end of the runway with recovery systems

Need more media training, not just books & tests

Widespread use of remote deicing and anti-deicing at the runways. Not just of the predominant airline at that hub

All of the accidents which have occurred after deicing have happened with Type I fluid. This should be reason enough for the whole industry to reject Type I as an anti-ice agent EVER! The reason I write this is because in my opinion Type I gets used way too much when conditions really warrant Type II or IV. SOP should be to use Type II or IV in anything greater than snow flurries

Most important things are time to takeoff after deicing and gross wt/power/runway length, etc.

Any deice system that allows for deice; inspection, and takeoff within 5 minutes would be good. Example-deicing should occur at end of runway when #1 for takeoff for maximum safety and confidence

I believe we sometimes "over kill" on deicing i.e. if the OAT is -20 and snow is falling, the only way to get the snow to stick to the wing is to put deice fluid on the wing, yet in today's environment that is what we MUST do.

Experience?

Engine running deice this season is a big improvement. Drive thru at departure end of runway reduces delays!

When in doubt my company always deices. Conservative but it works. I trust my company procedures with my life

As for training, pilots are visual people, a training video with types/rates of precip., different fluid types on clean and dirty wings. Failed fluid and how it looks when it is failing, would be very informative

To meet requirements, suspend all winter operations. The Government has gone too far. That's not FAR it's too far!!!

We don't get much

More standardization/training for ground crews on deicing

Crew training is at best adequate, at worst unsafe. The many comments heard related to deicing occasionally imply unimportance for COMPLETE deicing (wings only, or wings & tail only or gear only, etc.)

Anti-icing/deicing just prior to departure, i.e. Denver is much safer and efficient (should not need to re-spray)

As I stated throughout this paper, training and more respect for HOTs and less reliance on visual inspections is the way to go. Also remember that you are asking this questionnaire to a group of people who I think need more training. If my analysis is correct, you will get a lot of positive feedback about a program that needs work

Better deicing equipment in the southern stations would improve safety the most

Ground crews at non-hub airports need GOOD training to ensure good compliance

More deicing pads by departure ends of runways with visual checks by personnel outside of the aircraft

Procedures are fairly good. Ground personnel & equipment is also good

For our company, the end result (a clean a/c) is met. The problem is the delay incurred. There seems to be no great improvement in efficiency in deicing a/c in a timely manner

There must be a way to have a truck positioned near hold short line to give each aircraft one last shot on the wings & tail

Lets deice near the runway of intended departure. Tactile check at end of runway within seconds of takeoff should solve most if not all problems. This would be an inexpensive "complete" solution compared

Better wing illumination for night use, deicing close to runway, ice detection devices

Need more anti-icing done near the ends of runways and more importantly near the time of takeoff

Aircraft should never be deiced for dept. until crew is present & can configure a/c properly and receive deicing data

It is a waste of fluid to spray an a/c that just landed with a coating of impact snow. It would be better to use a broom or mop but we have to spray gallons and gallons

I feel that the deice situation has been regulated too much. Every situation is different. My company's answer is to deicing. The a/c when there is ANY ice on the plane. When there is a trace on the leading edge, we deice the whole a/c using numerous gallons of deice fluid on all surfaces of the a/c when there is no precip. falling. Safe? Yes. Conservative? Yes. Wasteful? Yes. I have

been removed from the decision making. I have way more experience than the person deicing the aircraft. Our present system is the result of wrecked airplanes and the ensuing stampede of lawyers. Pilots/aircraft engineers could have devised this system decades ago and could continue to improve procedures/technology in the future. My company-nor many others-will pay for anything beyond the FAR requirements. Unfortunately, the FARs are a political rather than engineering product. Good luck!

The company should make it easier to receive tactile inspections just prior to takeoff if necessary

Awareness & review essential

As I think you know, the weak link in the current system is assessing anti-icing fluid failure. In addition, the fact that the process is so time-consuming, can affect a crews' decision when the call is close

I think our company procedures are excellent, as I said to the point of overkill. Once again- remote - remote - remote!!!

The training of ground personnel is overall poor and this is a particularly sensitive or important procedure. At the hub our mechanics deice us so they have a better understanding of the importance of the matter. Some old equipment is sub-standard. We cancel most flights due to inability to maintain the schedule with flow mgt. problems & the limited depart/HOT requirements during ground icing in STL

Point of T/O deicing capabilities at airports & Type II/III deicing fluids ideal situation. Requiring visual inspection from inside aircraft by pilot very unreliable especially at night. Having some sort

The best improvement I can think of would be to have a positive method to identify fluid failure. This is too subjective at this time

Should be shown EXACTLY what to look for from the cabin, also should be shown EXACTLY what to look for on the wing root chevrons on the DC9

Have "car wash" type deicing at end of runway so there is little time for snow/ice accumulation

Drive thru deicing at runway entrance point line PIT or SDF should be our goal

Some stations and personnel are over-cautious probably best way to be!

Ground crew training much better last several years

At the larger co. hubs, deice personnel are full-time for that day. The best other airports use ramp people taken from their other job. This seems to be where we get the sloppy rushed deice job. Just human nature, they're trying to get the job done so they can go sit down and watch TV. In my airline career, I have watched deicing go from non-existing "I will fly" to what we have today, "HOT, charts, new fluids and procedures. I remember asking ramp people, if they could maybe sweep the wings off (DC-9) and hoping I wouldn't have to protect myself. I know how airlines operated, I saw, (years past) and we were lucky. I think our de-ice procedures in effect today are the single best thing that could have done for cold WX flying. I believe pilots have finally breathed a sigh of relief, the pressure is off our backs, now "we have to deice, no question" it is the

best thing. We have all been rushed at one time or another, have taken chances when deicing was only for the most extreme times. I can only observe my airlines procedures. I think the last 2 winters have been much better in terms of standardization, and looking at deicing as part of everyday winter flying. Our new style de-ice trucks, designated de-ice pads on airports better trained employees. All make cold WX operations 100% safer today. We need to continue to find better fluids, faster procedures, new ways to de-ice, but we as a whole (industry) I think, are doing it the right way now. We have finally taken snow, frost, ice, on aircraft wings serious. In my operation DC-9 - I still have problems with: fluid leaking in at cockpit window seals. Fluid sometimes being sprayed too heavily at seams in tail filling tail cone areas, access doors etc. Smelling the fluid when A/C pacs are returned back on. Fluid in jetways, tracking into aircraft entrances, causing slippery floors and witnessing passenger falling. What will the long term effect of this fluid, steam, breathing, will be on deicers, crews. Lazy ramp people not doing their job, or half assed (this I realize stems from management not de-icing). I do wonder at times about wing inspection at the gate. If the person really "did his/her job". Twice I have found incompetence causing delays, re-deicing, unsafe procedures.

The safety of flight in icing can only be helped by all airports being required to have fixed deicing equip located at, or very near end of active runway & FAA requirement to give priority to deiced a/c to takeoff - much like system in place in PIT

The videos we've seen of fluid failure are not too good. Not sure any photo could capture anything but an obvious failure

Deicing needs to be accomplished at or near departure runway during heavy snow at busy airports. Prolonged delays enroute to runway only require return to company deicing area

I believe pad locations just prior to T/O is the best way to go

Need more deicing @ end of runway. Crews need more info pertaining to fluid failure

Need ice detectors on wings (electronic or infrared, etc.)

Deicing personnel well trained and doing their job as close to the departure end of airport is very important

Non-aviators doing the hands-on upper wing inspections are good if they are trained properly. It seems that new/inexperienced personnel error on the conservative side. I have undergone numerous deicings when an upper wing inspection is required because of temp/dew pt. spread-Knowing that we didn't need de-icing. Comment normally is "To be on the safe side we better deice". Our company procedure is not to argue or disagree with ground personnel doing the inspections. To error on the conservative side is perhaps a small price to pay but after 20 years of winter flying I know we waste a lot of fluid and time that we didn't waste years ago. Better trained ground personnel might save lots of time and money and be just as safe!

My company has installed additional lights to help see the wing-it helps. I wouldn't mind something like having certain strategically located vortex generators painted &/or marked to help identify the presence of ice.

Deicing should be at runway end by station so HOT/holdover times not exceeded or crews rushed

Fluids are a nightmare. There must be a better technology developed to free us from them. A heated wing or something of that nature that continually keeps the surfaces free & clear is the ultimate solution we must seek. Deicing fluids, are absolutely unworkable, unreliable & virtually impossible to access at time of takeoff

Consistency, everywhere, is paramount. It is getting better, generally; and with persistence & vigilance I think we can approach the highest level of safety

Wing sensors!
Require tactile check or electronic sensor esp. in area susceptible to freezing rain/drizzle

Our company has excellent feedback on how our deicing procedures are working

I think the biggest problem we face currently with the process in the US is that it takes too long to deice. With Type I only, the holdover is gone before the process is complete. We tend to use only 1

The biggest problem I see is getting deiced at the gate then getting in line and waiting for T/O. The ideal situation is to go through deicing at the end of the runway just prior to takeoff. I don't know how practical it is but holdover times wouldn't be a factor

Have an icing safety officer at the hold-short area giving an object "non get home it is" call on wing conditions. His call could either be mandate or recommendation

Visual inspection of wing from cabin is ineffective. We need some type of sensor with a cockpit readout!!

Better training devices, pictures, videos, etc. Perhaps specific rules addressing flight into freezing rain/drizzle

Get the parties involved to really see the importance of deicing/anti-icing rather than just required. Mandate procedures that require specifics in specific WX to insure safety i.e.: 1)when any freezing precip is occurring deice when #1 for T/O-why push the limit at airports like ORD just to keep efficiency & on-time performance. 2) If we are to rely on outside personnel to assessing all a/c surfaces, make them accountable with signed forms - such as the Capt. Sign release. 3) Increase safety by mandating sensors on A/C surfaces - especially the tail - where many people spray but don't look. 4) when an A/C is deiced it should be completely deiced - not the "just the wings - or just the leading edges" - since it costs more \$/time - yes it is safe also! 5) remove all deicing procedures from the terminal area and have it down as close to T10 as possible - "wash areas" such as Denver seem effective and organized - ground personnel do not have to worry about overspray and concerns that exist @ terminal/jet way. 6) Have FAA produce a fluid failure video. Don't forget the "take-off clean tail concern".

Assessing wing conditions at night is very difficult on my aircraft. Any device that would improve fluid failure detection would be welcome by me

Taxi lines/lead in light should be more clearly defined in pad deicing

I think the cabin wing inspection is not always accurate and a cockpit camera/device would improve accuracy

Airports that have setup offgate deice pads (next to the runways) are the best all around

Car wash type deice units at ends of runway are great! (PIT RW 28R)

Discussion on fluid failure

1) Car wash at departure runway. 2) Big lights. 3) External inspectors. 4) Common sense

Our company has come a long way in the past years to make deicing safer. The key is to be as close to the departure end of the runway as possible

Pictures or video of failing fluids would be informative and helpful

Remote deicing is the way to go

Deice and outside visual inspection needs to be done at runway!

For large aircraft the drive thru wash (deice) would be better and more efficient than the bucket-trucks. No one wants to pay for the though! Too bad.

Would like to see more clear guidance for (light) freezing rain/drizzle

ORD built a large run up pad @ RWY 9R - use it for deice when taking off east - or pad @ 22L for other departures - no deice @ gates - deice near runway end and then takeoff

Deicing should be coordinated with GROUND/TWT to allow takeoff soon after deicing if not ground crews near end of runway should be available at night to inspect

A lot of problems associated with MD-80 wing frost and deicing could be handled with a couple of 1 or 2 gal hand pump - type sprayers

Let's deice at the runway just prior to takeoff with a human controlled robo-type car wash!

I feel more confident in a/c where the pilot can see ice building up on a surface. Black stripes/contrasting dark colors are a big help as is proper night lighting

If more pilots would use wing heat on the approach - I wouldn't have to deice as often - sad but true

End of runway deicing at all airports should be required with trained ground personal to inspect wings afterwards

Have a "car wash" arrangement at the runway and recycle the fluid

Deicing bays/pads at dept. end of runway are the REAL answer to improving safety. Like DEN & CDG

Yes. Require visual/tactile inspections to be performed, by certified personnel, just prior to aircraft taxiing onto runway for departure. This is the safest scenario

A video showing fluid failure would be nice

Spend the money to properly equip airports with major hub activity!

More info on fluid failure

Standardize, standardize, standardize training and ops

A standardized approach e.g. all airports have "just before takeoff" deicing & inspection

Recent improvements are great, but we (cockpit crews) are STILL "training" ground personnel. Evidently there is a

- high turnover in ground deicing personnel. Not one has the required "verbiage" of our checklist been done properly by ground personnel
- The best protection would be deice at the runways. I feel in the long run this also would be cost-effective to the airlines as well as the airports. This also may solve a number of the environmental problems arising
- More info on fluid failure
- Produce a good video, and show in Fall
- Deicing should be done at the end of the runway just prior to T/O at all airports
- I would like to see color pictures of all the various conditions of fluid failure
- Installation of ice detection equipment (similar to that in use by BAe 146) would be a significant improvement
- I would prefer to use the end of runway car wash set up we used in the military and is currently used at PIT (PIT's not exactly this but it's pretty close to it)
- Yea! Don't fly if it's not safe!
- Use common sense and safety #1. Safety + saving money do not mix
- Have fixed deicing areas with recovery methods to reuse the fluid and not pollute. Also fixed or equipment and not trucks except in rare or emergency use
- It is impossible to assess deice effectiveness from a/c especially at night. We depend on our deice crews
- I believe pilots and mechanics or whoever deices aircraft should go through the training together and have discussion groups to go over problems encountered the previous year. It seems the same problems come up year after year (i.e. see notes D5, C3, A3)
- No system ever reaches perfection-But over the last 29 years I have witnessed vast improvement-Especially in the last five years also with the introduction of new improved fluid checks
- 1) Add detection devices. 2) Give hands-on demo of fluid failure
- More visual aids to help recognize fluid failure
- Deicing should be accomplished just prior to takeoff near the runway, period
- I would have much more confidence in our procedures if we simply de/anti-iced right at the end of the runway
- HOTs are more useful to lawyers than pilots. The safest operation requires anti/deicing at the end of the departure runway when #1 for takeoff or minimum taxi time
- More practical examples/scenarios/visuals
- Respect ice, can kill you. But after deice observed 3/4" strip of frost/ice on trailing edge of the flaps-that's bullshit! We deice because we care on side of safety. Exist real world of deice that does or will affect safety of flight-then bureaucratic world of deicing which unfortunately is the environment we operate in today. No judgment at all, if ice (barely) you deice! Costly bullshit!
- Color photos of fluid failure during day & night time in aircraft would be of great benefit & improve safety. Condition horizontal tail seems overlooked. This little wing plays an important part and cannot be seen unless door is opened for visual inspection. Small fiber-optic camera or periscope type device could be used for inspection. It would have to be convenient (i.e. operated from cockpit) and easy to use
- My company sends ground inspectors around at the hub to determine if deicing needed. Frequently they say it is needed without crew seeing anything. Puts the crew in position of going along or bucking opinion of the ramp person who has never flown airplane. Putting deice fluids (particularly Type IV) fluids may degrade performance if a/c is already clean. Fluids will still be on a/c after a 2-hour flight
- The safest method of deicing requires completion with minimal time to takeoff period
- The FAA is not SERIOUS about deicing until it is done, just prior to takeoff the ONLY solution is to be deiced, just short of the departure runway. Then be next for departure. DO THE RIGHT THING! Deice should be done short of the departure runway just before takeoff
- Ref. page 2, question C2. Thanks
- Mandate the type of deice/anti-ice operation found at PIT, where you are sprayed & taxi a few hundred feet to T/O practically immediately! Why isn't it ALL like this?!! Every airport should have this (PIT) set-up!!
- Engines running deicing has greatly improved delays and not exceeding holdover times
- Need more definitive information from reliable controlled testing for freezing drizzle/rain
- Sensors needed on many locations of wings & elevators/stabilizer & ailerons & rudders
- There is now greater awareness as well as emphasis on deicing procedures, mostly due to accidents. The FAA reacted with the HOT concept and the airlines left the implementation and a lot of leeway with the Captain. The company seems to be wary of doing more than FAA requires partly due to detail level is high already. Result is better guidelines. Captain has the final say, should never change
- The system works pretty well but would like to see deice trucks/towers at the end of runway for one last shot just prior to T/O
- Make Type IV fluid available at all stations. Not just hub stations
- We (TSA) could use more Type II/IV deicing fluid but, FAA allows us to use Type I
- Deicing at pads near the runway offer the best & only means of taking off with clear aircraft in moderate to heavy precip
- Young generation does what they are told with no attempt to develop their own judgment system. Establishment of all these "crutches" prohibits this experience development. Additional artificial "regs" further interfere with thoughtful & thoroughly supportable mental effort-the "thinking pilot" is being regulated out of the cockpit! This creates a dangerous situation!
- We need help in the cockpit from sensors. Better training all around, flight crew-ground personnel. Encourage universal anti-ice/deice policy
- Need better lighting on a/c to check wing's condition at night. More training emphasis on the issue of the first officer making the *go/nogo* decision based on his assessment of the wing prior to T/O. Specifically in marginal situations. The case is often that the FO

returns to the flight deck & reports that wing is apparently near the end of HOT but still seems OK or that FO really can't see much out there at night. Wide variance on what captain's due with this limited information

I am familiar with the history of my carrier for last 40 years and I cannot remember an accident or incident related to faulty deicing procedures. As far as I am concerned the procedures now in use are more than adequate

I've never seen a wing immediately after fluid application or fluid that is losing its effectiveness for comparison. The ONLY safe way to deice/anti-ice is to do it just before you takeoff. No holdover time calculation needed, no additional visual checks needed. Get the job done and get out of town!

1) Require black stripes (like TWA) so we can determine snow/wing. 2) Deice should be near end of runway. 3) More/better pictures/videos to describe contamination wing/failed fluid

A mini camera of some sort might be a useful device for evaluation of the wing. Perhaps with a refractory grid that reveals the presence of ice/snow

The equipment used to deice a/c should have minimum standards like the a/c they are deicing!! Our homemade sprayers are a joke!

Install a deice pad on each taxiway prior to each departure end of the runway. Have all fluid drain for recycling i.e. eliminate environmental problems. Use trucks that wash a/c under pressure and is flexible to type of a/c. Racks are a poor idea. Require all operators to pool resources and staff to operate facilities. Don't allow contract labour. You'll get contract quality. All the Laws and regs you pass

Very critical-delay reaching takeoff roll. Some airports do not afford an area close to the departure end, hence a long taxi time

1) Standardize deicing worldwide. 2) The deicing process should always clean the wings last to maximize safety. 3) The real long-term solution is to develop better deicing fluid

I think awareness has been the most important deterrent to icing - induced accidents

The best development in the last few years has been the Type II & IV fluids which increase your holdover times. Remote pad deicing is not. Would be glad to have bright lights available, and/or people near hold short to inspect a/c

Initial training should be more thorough. Day/night video of actual procedures and fluid working/failing would help

See attached comments.

All training at NWA has been verbal and written. I'd sure like to see some pictures of good/bad anti-ice fluid. Look at how European airports do it. Personnel at runway to check for icing would be extremely helpful

This survey is the first time I ever heard of fluid failure.

Maybe some training on this subject is in order

See comment in Question C7

Whenever possible deice trucks should be positioned near departure (takeoff point) someone should explore the value of using heated fuel during freezing rain and

heavy precip conditions. The device should be able to be heated by inflight anti-ice equipment on the ground. Wide variation in equipment and skill from station to station in our system

The key is getting deiced immediately before T/O. Type I, II & IV or warm cow piss doesn't make a difference if you can be rolling within 1 minute³ off the deice pad. Place trained individual in a cherry-picker type vehicle, at departure runway(s), who can visually inspect surface of wing & advise Captain by radio what he/she sees from up close with adequate lighting so the Captain can make an informed decision whether to takeoff or return for deicing. This person should be trained in a similar manner as the flight crew regarding "HOT", precip. types, fluid failure, etc.

The de/anti-icing problem is almost out-of-control. Pilots deice when not necessary to delay flights, buildup "actual" for pay, and fear of letters to the company. Passengers stop by the cockpit and/or "brief" flight attendant. about their knowledge of dangerous conditions outside a/c. Company "ramp strollers" stop by & "announce" you WILL be deicing when it's not necessary. What we need are more "EXPERTS"!

End of the runway deicing always the way to go. HOT rarely a factor then

To eliminate any question of safety during icing conditions, a/c which are #1 or #2 should be deiced. This procedure would ensure holdover times are never exceeded & any doubt would be removed. Weather conditions and variations are too great to overcome with any set of procedures or regulations. It is high time to stop trying to outsmart a simple fix to problem with so many variables. Set up de-icing to take place at the departure!

We need to have class on this in transition & recurrent training

From just reading the questions on this survey, I realize that my company is not doing the job they could with providing the pilots with information

More trucks/equip that work

Overall, I feel our company's deicing program is safe.

However, I question our (crews) ability to determine fluid failure or conditions warranting a return to gate to deice. An ice sensor with a master caution (if reliable) would be an invaluable aid to assist our judgment

Remote deicing as close to departure & departure runway is the best & safe

Type II & IV fluids with HOT guidance has been great.

Wing "sensors" & better wing illumination WOULD BE great. Option of having CAPTAIN make visual assessment prior to T/O (at Captain's option) might allow more experienced (and sometimes more motivated) crew member to make assessment (as a CAPTAIN, I've never done that since engines are running & holding short for take-off). Every large airport should de-ice like Den. De-ice pad is well equipped and organized. De-ice pad is very near Rwy 34, and taxi times after de-ice can be very short. ORD can be almost impossible at times due to ground congestion and significantly large taxi times (after de-icing) during snowfall. Personally, I would find it very

- difficult to rely on a "before take-off" visual inspection by a non-cockpit crew-member (outside), although this would probably be better than the inspection we now try from inside. A concern would be what if cockpit crew isn't convinced or comfortable and outside inspection crew at take-off area says "its clean".
- Would I feel pressured to go? Presently, I enjoy command decisions which are not second-guessed later by non-cockpit personnel.
- We are extensively trained, all of our cold WX stations are very competent. Problems relate to lack of type3 II at outstations. Lack of experience at warm WX stations which occasionally deice which may be partly due to turnover
- Aircraft need to be deiced at end of runway prior to takeoff 3-5 min wait may till takeoff. Fluid should be recycle by drains in ground. (You all know this). Again, what a joke!
- A video with the training aids listed on page 3, para. C1, to be included in annual training
- Applications should be done at runway hold line, not in parking spots or on ramp with taxi of unpredictable length areas
- I feel more training is required for pre-takeoff inspections. A 5 min videotape doesn't cut it
- A-320 requires specific valves to be closed prior to deicing. I have seen a/c deiced prior to PWR being put on a/c. When this happens some of the valves were not closed. Then you can smell deice fluid during T/O & climb. A/C was deiced prior to getting to gate
- If in doubt/deice/re-deice
- Deice at remote pads near the end of the runway. If that procedure was routinely used, most of the previous questions would be mute!
- Yes, final deicing point near end of runway at large congested airports where there are delays in a taxi queue in getting airborne-smaller airports generally don't have a problem with much delay in leaving gate and getting to runway and airborne so fix the large airports (i.e. ORD, IAD, ATL, BOS, etc.)
- Go look at European airports. They are far superior to US airports at deicing procedures
- Night time is the worst - illumination of wing is needed everywhere
- I like the drive thru deicing at the end of runway the best as in Paris (CDG)
- Always be conservative. If in doubt, deice!!
- De/anti-icing just prior to takeoff is the best weapon we have
1. It is almost impossible to get airborne at any major airline hub within holdover time. 2. One major problem with ice is the unwillingness of St. Louis ground staff to deice a/c in a timely manner. Another is their nearly universal unwillingness to use anything but Type I fluid. I don't know if this is an economic problem or what. 3. Another problem is a flight crew unwillingness to use wing anti-ice to save fuel. Give aircraft in winter ops a shot of wing heat on approach and landing even if wingers/nuts. etc. are clean vastly reduced the amount of ground de-ice needed. Otherwise an airplane that gets dirty on approach needs to be sprayed - even when precip. isn't reaching the ground. In such instances, any fuel saved is false economy.
- Wish company would add large black stripe painted on wing like some others do
- Most airport go overboard in making sure we are deiced properly. I like the better fluids, (IV), but to let pilots be more of judge when deicing might not be necessary (light snow no adhering)
- The amount of time and effort spent on deicing today is way overkill from what it used to be or what it should be
- Required maintenance checks on deice equip prior to season & re-training every year for equip operators. Our turnover of that type of employee is high
- Most of the time we have been deiced on the MD80 is due to the fuel being cold and the moisture on tope of the wing is I cannot believe that the FAA certified an airplane like this when it has this problem
- Pictures in ops manual or during recurrent training of wings with "good" fluid vs fluid that is saturated would help
- Include degraded performance T.O.S. (i.e. iced up wings/tail) in proficiency checking simulator training
- End of runway, car wash, de/anti-ice systems look to be the most efficient, safest method. Placed over drain systems, fluid could be stronger, more toxic and recycled
- 1) Decals on wings. 2) Special surface of over-wing windows to ease observation. 3) Improved lighting of wing and/or decals
- A more serious approach to this matter especially training, would be a nice change in the way our company deals with safety issues
- Picked a VERY mild winter to ask these questions, but thank you nonetheless. End of runway remote pad deicing is only consistent way of solving return to re-deice problems at busy airports. Only times I've ever returned for more deicing have been at ORD when we got stuck in long lines for takeoff in snowy conditions. Theoretical knowledge is nice, but most of us don't understand how it works.
- Deicing/anti-icing at gate (for other than overnight frost) when precip is falling followed by a "visual check" is a less than satisfactory procedure. BOTTOM LINE: during icing conditions we MUST be deiced when #1 at hold short & takeoff clearance is IMMINENT. Obviously very costly but it is the only way to solve this problem
- We have come a long way since Air Florida at DCA - Please continue the hard work. Thanks
- Living in an area with freezing weather aids one's understanding and application of adverse conditions
- We spend too much money deicing when it is not necessary. Our deice inspectors are not pilots. They are told to deice even if there is a dime size piece of ice on a 120,000 lb aircraft. A little common sense would go a long way in saving time, money and deice fluid. Give pilots the latitude to run an efficient operation by using common sense. The regulations, as interpreted by the company, make us de-ice if any ice is on the wing. So we spray the whole aircraft even if a droplet has frozen

- under a wing hinge. There is too much Big Brother involved here. I, as a pilot, de-ice even if I know that it is not necessary, because someone that is a passenger may turn me in because they saw a snowflake on my wing. Everyone is an expert!
- High quality video program
- My opinion of the FAA's wing icing program is that they went overboard as always (knee-jerk). First 25 years I flew in airlines, took off with varying degrees of frozen precip on wings, always light verity. Naturally if we had a lot of ice were deiced. One must keep in mind, that if some frozen precip. was suspected, we would not load the wing very much at rotation. With the inexperience level within the industry this past decade, new pilots will snatch the aircraft off the ground as if it was a clear beautiful day with a light load like they normally do. There have been many times when my wings would be very cold soaked, but clean of ice and still have a small amount of very dry snow on them which will blow off with the slightest breeze. I'm still obliged to head to the de-icing pit, to waste time and money. The decision to deice has been taken away.
- A deicing pad at the end of runway would improve safety of deicing procedures and save airlines a lot of delays due to weather
- Freezing precip. should require a tactical "hands-on" inspection for the pre-takeoff contamination check
- Yes, runway deicing when #1 or #2 for departure followed by an external visual check of ALL control surfaces
- Make de/anti-icing an airport facility at end of runway (and collect and recycle overspray)
- Just read my notes throughout. Thanks for doing this. I want aviation safe too
- At my company, the decision to apply anti-ice/deice fluids has been largely removed from the pilot-as before, the decision to actually takeoff remains with the pilot-I think we get very good deice-anti-ice service and I am very comfortable operating (or refusing to operate) in winter weather
- Deice at the ends of the runways just prior to takeoff everywhere! It's the best & only way to assure good/safe ops! This isn't rocket science, it's penny-pinching bureaucracy.
- I am an instructor as well as line pilot. Work in the training dept. considerably reduces my exposure to deice/anti-ice operations
- Get the politicians out of policy making and give the real experts policy making power. Nerff said!
- We need to have training on identifying failed fluid
- I feel the training at my company is adequate
- We have a good program in place. However night time lighting/detection could use some improvement
- Type II & IV fluids have solved most of the problems. The problems remaining are in extended ground time delays which rely on crew observation and assessment of fluid condition
- Need sensors on critical control surfaces to really be sure have not have fluid failure. Visual inspection from the cabin window is poor, especially at night
- As stated earlier, deicing equipment should be a responsibility of the respective airport
- Request actual training, not just a bulletin
- Generally, I feel our deicing procedures are adequate, if not overkill for certain situations - each type of a/c is different
- Pittsburgh has the best offgate anti-icing program; it should be mandated that all major airports with numerous icing days have a system similar to PIT's
- Flow control with ATC would assist in the ground deicing program so that one does not have to be close to the holdover time
- The FAA has forced deicing when not necessary. Where is the fluid going? From article enclosed, at least one Congressman wants to know
- Yes, how about those end of runway "car wash" type de/anti-icing machines I have seen on Discovery Channel and Aviation Week - High cost - Yes - but worth it!!!
- Standardize equipment and procedures at all airports. Provide better more timely information when fluid technologies, procedures, etc. change
- Use good conservative judgment
- Yes-We must shut down our engines to be deiced-by the time we are deiced & ready to taxi many times our HOT has already expired. We deice on the gate. Let us deice at the end of the runway just prior to T/O (this doesn't happen for us in STL)
- The biggest obstacle that I have noticed as a crew member during the deice process is that it takes too long from when deice is started to the time the a/c reaches T/O rwy and steps should be taken so that the crew can coordinate with ATC so that minimal time can take place between deice and takeoff. Something like a proposed deice time should be given to aircraft by ATC so time and money can be saved as well as safety increased. Current de-ice and anti-ice fluids are capable of performing the job, but steps need to be taken by airports and ATC to improve the current system not new gizmos and gadgets.
- Ref C11 instrumentation in cockpit that would alert flight crew to failure de/anti-ice fluid would be best improvement. Additionally, standardizing de/anti-ice procedures & providing remote/runup pad deicing areas (especially large airports) would improve safety. Developing coordination plan with local controllers & airport operators to insure minimum depart. delays after de/anti-icing procedures would improve safety. Wider availability of Type IV fluid is needed.
- Better understanding of physics & aerodynamics regarding temp & pressure over the wings during takeoff. I want to see pictures of failed fluid
- In known icing conditions, there is no reason not to be checked/deiced (by maintenance or someone) just prior to T/O. (External physical check)
- Training of ground personnel is inconsistent and generally poor. At outstations the equipment is frequently poor
- Block C-7 comment sums up my thoughts. There should be one conservative, industry-wide procedure to deal with this insidious threat. It should be done by airport's facility. It is just like maintaining runway lights, painted lines, and fad. If this procedure occurred at last change-there would be no threat of a problem, and I

would not have to look out some opaque, fluid covered window and "think" we are "good to go". There would be no conservative to liberal thought logic in the thousands of different cockpits making these decisions. ATC/weather reports need to be factual not just what they think pilot wants to hear

More emphasis on experience level, and previous operating experience in icing conditions. We have crews who have never experience adverse pre-takeoff icing conditions until they are PIC

Why doesn't EVERY northern airport have a car wash type deice apparatus at the takeoff end of the runway? How simple could it be?

Let's get deiced at takeoff point at every airport

Wing anti-ice is prohibited from coming on until 7 min after T/O on B777. It comes on if auto detector tells it to. I've rarely seen it come on in what I would call icing conditions

The company/dispatch will try and get anyone to fly in freezing drizzle/rain. If you won't you get raked over the coals ants intimidated. If that does not work - they try get someone to do it

Years ago there was probably not enough concentration on deicing. Now there is too much causing unnecessary deices and drenching of airplane. When you go out on ramp with 2" or more fluid or have fluid flowing out of engines, we have gone overboard! The FAA rules the!

Most deicing is done in-house. The program is closely monitored by station managers and is extremely successful!

Better lighting

On certain aircraft where it is difficult to access the wing for viewing, sensors would be extremely helpful. However, we must also keep false alarms to a minimum

Deice pads have been constructed @ all runways at ORD. Either deicing should occur here or have trained personnel available to inspect aircraft prior to takeoff. This would help eliminate the "guessing game"

Infrared cameras that can see ice on wings, viewing device that detects ice on wings (used by Delta)

Required tactile check in all freezing rain/drizzle conditions in the dept. pad near hold line

"Drive-thru" bird-bath type systems like at PIT & CDG. More use of Type IV fluid

HOT usually is too restrictive and not realistic times are exceeded to quickly for a B-747. HOT is exceeded before deicing is completed

Do not put much emphasis on holdover charts because company policy requires that we do visual inspection after we have been deiced and result of inspection would be basis for *go/no go* decision regardless of holdover time, I guess if were way past holdover time I may be more reluctant to go with marginal conditions or if the visual inspection was difficult to conduct. Poor visibility through inspection windows or the such. I think that a night visual inspection is a very difficult thing to do. I feel that our OP specs at United are way too restrictive in requiring a visual inspection of the wings with "any precip" falling after being deiced. Many pilots I've surveyed don't do it because there are

times it's just not required. After all 2 snowflakes in the area is "any precip". I have written Capt. reports and tried to have this changed but it is next to impossible because it would be perceived to be a relaxing of safety standards. I did some work on this issue as a 737 LLA at United and would be happy to discuss it further.

It's nice to address fluid failure, but the major problem of deicing and takeoff in icing conditions is the time between deicing and takeoff. This area should be addressed first!! 5-10 minutes from deice to takeoff would eliminate most deicing problems

One rule to cover all aircraft

Training and written guidance should be improved to eliminate vagueness and improve practical applicability

UAL does an excellent job

1) Don't FAA and/or manufacturer have videos of fluid failure (especially as seen from cabin)? If so, make them available to us. 2) Develop some "icing index", a combination of temp, precip type, precip rate etc., that would consolidate some of the variables. The combination of index and time since deicing would be more use to us than the existing information. The re-deice decision could be as simple as: "If INDEX x TIME > some number, then return and get sprayed again". 3) The existing system of expediting a/c to the runway after they have been de-iced doesn't work very well in practice. We should have some system of assigned taxi times (and no delays if possible) so we can plan de-icing accordingly.

The best procedure would be for ATC to assign definite takeoff times so that de- and anti-icing could be timed accordingly

Precipitation intensities could be more or better defined. Assure ground crews at smaller airports are adequately trained. More deice equipment closer to takeoff hold time

Critically on non-led aircraft DC-9-10, F28, F100

The best operations I have seen are the drive-thru type near the takeoff end of runway. These seem to be the best method. They efficiently reduce problems with holdover times, and also recycle or contain the ethylene glycol mixture preventing leeching into surrounding holding ponds. Ramp areas are less slippery & safer for ground crews and vehicles. Many advantages to this type of system

Setup deicing near departures end at all airports so that takeoff can be accomplished within 10 mins after completion of de/anti-icing! I consider this THE ONLY WAY TO BE 100% sure of a safe takeoff in conditions requiring de/anti-icing!

ATC should broadcast (not yet established) icing condition report-categories via ATIS/Tower/GC so as to remove subjectivity from cockpit. Current procedures are too loose - subject to interpretation

See C11

More video presentations in recurrent training regarding icing and takeoff and landing techniques to minimize the hazards

No, this survey is too long already

Something other than only the read & initial file

Jets - ground icing - be careful -- Props - flight icing - be careful -- Visa versa - don't worry too much
 Shortest time as possible between deicing and takeoff, anything longer is a compromise of safety
 See previous comments
 Deice at the runway departure and is invaluable
 Deicing/anti-icing at gates vs the LEAST desirable method
 Practice, practice, practice for the deice crews
 What we have is good, but we need more technology in determining "actual" conditions and not rely on subjective observation for both weather & fluids
 I'd like to see regulation on deice fluid being caught at deice pads so we don't contaminate the ground & ground water - we don't have this in MSP (Remote ramp)-it concerns me
 Fellow pilot5 criticized by management for inspecting deicing crew's job. Policy sometimes higher priority than individual event
 Visual observations are sometimes difficult, but if there is any doubt, don't go. Deicing closer to runway is best
 I'm tired of pushing the HOT of Type I fluids while waiting for departure. Company should either use 2 step process with Type IV or coordinate with ATC & remote deice site for a deice slot at minimal wait for departure
 More visual training on fluid failure!
 All de/anti-icing should be performed in the vicinity of the takeoff runway threshold
 I think ground deice/anti-ice has been OVERDONE. We deice because of precipitation not if ice snow is accumulating on aircraft. Too much deice is done to satisfy the lawyers than to using GOOD judgment & airmanship
 I'd like to see deicing done near the end of the departure runway within 5-10 minutes from departure so we can deice and takeoff. The car wash style operation such as PIT. The fluid can be recovered and recycled on site would be ideal. I'd like to see individual vendors operate the deice system and bill the airlines for each splash. This would eliminate the hub technique where I feel that the hub airline that runs the de-ice equipment pays a great deal of attention to their a/c and not the visiting a/c. The exposure would be more uniform through out the industry. Quite often at a non-hub out station the fuelers also do the de-icing and I see that many are not trained very well. If their job was deicing alone or de-ice/fuel then more attention would be paid to de-icing. I often see that that's-good-enough attitude. We still have a few hurdles before we see where we need to be. Thank you for your work.
 I get the distinct impression there should be a definition of fluid failure & a means to make that readily apparent to the flight crew
 Personal humans not videotape
 Place deicing taxi thru at the departure end of each runway with a FAA cert. operator who guarantees readiness
 Reminder that heavy rain can also affect stall speed
 End of runway deice pads are essential for large major airports
 Training: see C1 c) & d) / Procedures: (see attached page)
 Summary is: allow no time interval between de/anti-

icing of both wings! Better illumination! Current leading edge lights NOT good enough to see upper surfaces. Need more "drive-thru" facilities like DEN, PIT! Should be an aviation standard for all needing service; 121,135,91
 We need end of runway deicing at large, busy airports
 More visual aids for identification on the ground, & more alt flexibility in flight for icing conditions
 I think a de/anti-icing station should be set up at the departure end of each runway - and anti-iced when an a/c is number 1 or 2 for takeoff. This would eliminate a bunch of headache, wasted fluids, returns to gates for additional deicing and most of all "guessing" if you are good to takeoff!
 The more education and training, the better aircrew awareness. Hence greater safety
 Deicing should be done at either end of runway or centrally located Swedish type fixed deicer. Reduce the pollution, taxi times, variable's in methodology, and the politicians aversion to accepting the responsibility
 Overkill - they should lighten up on a/c with led and high aspect ratio wings
 I'll say it again. Change the procedure to deice at the runway. Have airports establish deicing pads with recovery systems. Airports could provide the deicing or the company. Gate deicing just doesn't make sense and is the reason re-deicing becomes required
 Type IV fluid in granular snow seems to fail a lot faster than in light snowflakes
 The best/safest deice is the "car wash" near the end of takeoff runway, with metered access to minimize delays after deice, and a HANDS-ON inspection by well trained ground personnel. Gate deice followed by a long-ISBN taxi followed by me looking out cabin window to assess the condition of the wing is still asking for trouble
 o do it? A better "PLAN OF ACTION" needs to be established
 More remote pad de/anti-icing would be good
 FAA films on fluid breakdown would be useful - also information as to how HOT's are determined - a little physics could go a long way
 Immediate T/O after being sprayed vs waiting your turn (as the holdover time decreases)
 Have regulations which state how close a deicing pad needs to be to departure runway. Have company policy requiring cockpit windows to be squiggled after deice
 On the DC-10 the pre-takeoff check should be done from the cabin because you can't see the wing from the cockpit
 We spent lot of time this winters deicing a/c when no precip was falling. What was being removed was ice, that had accumulated during the previous approach. Most of this was purely "trace"ice,1/8 or less. I see no safety evidence that trace ice has caused a mishap. Yet now we have literally hundreds of airplanes having trace ice removed. We welcome an accident by doing this, as we have increased risk to people doing the work, and to taxiing aircraft by the sheer volume. We need a return to sensitivity on this, and some good guidelines.

Our ground personnel turnover ratio is staggering; this results in a continuous personnel shortage. Very poor training levels (mostly to satisfy paperwork requirements), and hardly any experience. In this risk of someday overlooking the potentially fatal. If our FAA would only unannounced witness our outstation deicing proc. they would unpleasantly shocked

C-11 question sounds like a great idea

The closer to the end of the runway the deicing is accomplished the better the system works i.e. takeoff immediately following deicing

More deicing ops closer to departure runways, less deicing at gate

A taxi thru system just prior to runway entry, with a recovery system for recycling fluids, would be the safest and most efficient

Sensors should be installed on MD-80 aircraft

As noted before, moving de/anti-icing facilities to departure end (or closer) of runway would greatly improve safety as well as improve outbound flow and negate the need to reroute return traffic for re-deicing

De/anti-icing needs to be done at departure ends of runways not at gates, or at pads that are at areas of the airport to allow long taxi times. Also when you go to a de/anti-ice pad you are usually put in a long line of a/c before departure which defeats the purpose

They have deiced us in DTW several times when we did not need it! Lots of wasted \$

The deicing trucks used by my company seem to be very unreliable. We seem to continually have problems keeping them working and/or running, whether the problem is a failed heater, pump, or of a more serious nature as with the boom itself. (We had a fatal accident due to manufacturing defect during the 96/97 season). It seems that these trucks are not well constructed and/or maintained and the people operating them not always well trained. The ground equip. Needs to be "preflighted", if you will, before they try to use it, and few seem to have been checked. The turnover rate amongst the deicing crews is high, and it seems we are constantly "breaking-in" all new crews (with little experience) every season. So, I would like to see more stability in the deicing crew ranks and better care/maintenance of the deicing equipment.

There are certain conditions that takeoffs should not be conducted, freezing rain, heavy freezing drizzle. At other times I feel that safety can be most protected by using the appropriate fluid and then taking off as quickly as possible. No matter how good the fluid I believe an expeditions departure is paramount. Procedures are much better now than 10 yrs ago but I still believe that when you need it most you receive it least. Heavier snowfalls takes loner to get to the runway. We still need procedures to get to the runway as query as possible

Most important factor is to reduce delays after deicing period!!

See C1 - Get good information out so one can make an "informed" judgment!

Move deice pads closer to runways. Get all large air carrier airports to build drive through systems near runways like PITTSBURGH

A good video of the wings at night from inside a 727 showing what Type II, IV fluid failures look like compared to fresh fluid

Someone near the runway to make an outside visual check of the a/c and deice again (there) if required

Deice at runways only

Would like to see actual videos of failed fluid

The restrictions, rules, regulations etc. are so complex it is almost impossible to operate in winter precip

Tell the ground crews to spray as if their family were on board

Type II & Type IV videos. Cover most of the common critical items

A program that allows exterior inspections (from a person on a boom) just prior to T/O (when precip is greater than light would be nice)

It's terrible that FAA-approved MD-80 when cold fuel in wing creates ice on top of wing when weather conditions don't indicate ice-look at the cost and trips up the ladder due to poor engineering and FAA's approval. Fix aircraft at manufactures expense!

Tow types of deicing crews encountered: 1) Have to be made to don't want to "delay" 2) Crews not only deice wings & tail but wasted tons of fluid & HOT by spraying fuselage, windows, ramp, terminal & passers by as if that helps!

I work for a commuter. The hub has good deice equip. but most of the time we can only deice at the gate & not by the runway only the major do that; so our taxi can be somewhat long at times. If we elect to go back to gate to deice, we have to start all over again & may not be any better off. Thing ALL airports should have program to deice by runway esp. when taxi long. Outstations lack good equipment

Good improvements in recent years, but would like to get airborne in MINIMUM TIME.

I began working in our training dept. this past Feb. So subsequently missed a good portion of this year's winter flying

Install icing detectors on a/c. Make them reliable, redundant and free from false alarms. May be technically difficult to do this, but present situation does little to actually improve safety. Greatest improvement has been in attention being paid-at a great cost in training manpower, etc. to eliminate UNBELIEVABLE decisions to commence T/O in obviously dangerous icing conditions

It's almost impossible to T/O within HOT. HOT begins at the START of deice/anti-ice. The procedure sometimes takes longer than the HOT so you've already exceeded HOT by the time deice/anti-ice is complete

An industry wide standard should exist for training on de/anti-icing procedures. With a program such as this, the entire industry would be up to date on current procedures and new technological advancements. The standard should apply to ground crews as well as flight crews

Color photos, slides of failing fluid would be helpful.
 Engine running (close to departure end of runway)
 deicing very beneficial

Our CRM & training on the subject leave a lot to be desired

More time & thought into training programs. More ground school time on icing & deicing

Again, this whole questionnaire is a waste of money. There is only ONE way to ensure safety during icing ops. Deice at runway. LAUNCH IMMEDIATELY! The FAA and local airport authorities are too scared of litigation to do this so they put the monkey on our back

More videos/pictures etc. of fluid failure

Not enough attention is given to the importance of tail surface deicing. Many Captains request deicing of the wing only & don't include the horizontal stabilizer which is just as, if not more, important

Minimize time from deicing/anti-icing to takeoff (don't even be close to holdover times). Have outside inspector available in pad to "final check" a/c in poor visual conditions. Maximize use of Type IVs & research fluid improvements. Setup deice pads near runways & control pushbacks to minimize ground time

It is the small airport where the service is contracted that you do not always get the same level of service as when you are at one of yours hub airports

My company requires deicing if ground personnel recommend deicing. Ground personnel-non-flight operations experience with some training (? 1 hour or 50 hours). Had/have to deice even though well within flight operations limits, i.e. barely (trace) of frost underneath wing by fuel tank

I question the braking action on runways covered with anti-ice fluid. Reports are always good but when I turn onto runway it is often slick. Anti-ice procedures for temperatures of 15 F and below need to be addressed. Had two cases this winter when we met the letter of the law and procedures but the anti-ice caused problems rather than solving it.

My impression is that airline safety in icing conditions was not a problem for many years. Then Air Florida crashed on T/O out of DCA and the whole issue got blown way out of proportion-the government cause to help! Air Florida crashed because of a tragic lack of experience in cold WX operations. The people who wrote their procedures & were flying the a/c that day simply had 0 cold WX experience. That has not been and is not the case among the old established major carrier - and yet we are paying the price for Air Florida's lack of experience. We now have enough procedures, instructions, guidelines and charts to confuse a busload of Philly lawyers. I believe that anything ALPA can do to simplify icing conditions procedures will enhance safety in this area. Good luck!

Black wing leading edges would help

De/anti-icing should be done as close to the runway as possible

Deicing should be done by runway when ready for takeoff, not on ramp or at gate

I think we deice too much-especially in very cold, light, powdery snow. We have had no icing crashes during

my 20 years, but we have had 2 fatalities during deicing

The most effective tool should be a team at the departure end of the runway to provide hands on inspection of a/c just prior to takeoff. Without this many elements of the deicing and inspection process are open to question and may not insure takeoff safety. Reluctance of airports to provide deicing areas adjacent to end of rwy is particularly disconcerting. Look for practical solutions.

Proper training of the deice crew

Deice near end of departure runway prior to takeoff. Have an airport deicing system rather than each company doing their own

More simulation. training on rotation rate during icing conditions & how to react if you inadvertently takeoff with ice on wings & you get stall, shaken, etc. (i.e. worse case scenario)

5\$/hour employees don't understand or care about the deice program! Repeatedly I ask for additional deice because they missed spots

The hardest part when encountering icing conditions and deicing procedures is ATC delays after being deiced. The delay should be before being deiced, not before takeoff

Answer in C7 & C11 only SAFE way to go. For now everything's a guessing game placed on pilots back - designed to satisfy the public, with no real help to pilots

Deicing facilities located near the rwy for departure are most efficient and probably safer, i.e. PIT. Also wing surface lights solely for the purpose of contamination inspection would greatly improve the ability to see fluid failure. These could be mounted above over-wing exits and could be used also during an evacuation

I would like to see the US operated airports switch to the "car wash" method a la CDG in Paris-we've never used the equipment there, but to get sprayed just prior to T/O (perhaps even after a gate deice/anti-ice) in moderate conditions would increase my peace of mind. Of course, we would need to have trained people at the departure end anti/deice ops area to insure uncontaminated a/c & therein lies the difficulty of building such a facility. If an aircraft went down after being de-/anti-iced via the "car wash", who would be responsible for negligence at the hearing?

Visual aids - common problem areas on my specific a/c I think they should (our company) provide a course on winter flying to include deicing. The use of videos along with an instructor would be nice

Engine running car wash at end of runway is the safest & best way to do this

A picture (or video) is worth a thousand words! Pilots need to know what they are looking for in the various types of fluids and conditions. Perhaps more training with video and/or color photos would enhance the training experience

Very good

I think that there should be ICAO standards for deicing/anti-icing and training

When in doubt, error on the side of safety

Properly trained ground deicing personnel to dispense fluid and to be deiced closer to the runway for added safety
Would like information on ground crew training and standards

I think common sense, awareness of conditions outside the a/c, and knowledge of the different effects of snow, ice, freezing rain (through training) are the paramount factor in a pilot making good icing-related decisions. If a pilot doesn't understand the effects of the various hazards, all the procedures and sensors won't make a bit of difference

WX reporting (ATIS) terminology and deicing/anti-icing assessment criteria should be identical. WX observations should occur every 15 mins during freezing drizzle/rain e.g. moderate to severe icing conditions. Visible should equate to precipitation intensity. Criteria for making an observation & describing weather phenomena should transfer directly to assessment card/procedure to evaluate T/O approach safety of flight compliance. Visibility should equate to intensity, type of precipitation should be categorized, temperature should further define type of precipitation e.g., dry, wet, freezing, mixed etc. Good luck - thanks for your effort.

FAA/Airport deice facilities at takeoff end of rwy for safety & environment

Icing and its effects, are so complex that a four-hour CLASSROOM presentation with AQ&A session included must be made mandatory. There are too many low time airline Captains with limited meteorological and aerodynamic training and knowledge!

Install remote TV cameras controlled from the cockpit to examine wing & tail surfaces

General comment-To ensure all crews review de/anti-ice procedures EACH Fall season PRIOR to winter WX especially carriers not accustomed to flying into inclement WX airports or new airport designations

Always visually check the aircraft in icing conditions
Have ground control flow to deicing such that deicing rate = 's to - no waiting

1) Type II or IV should be available at all stations. 2) Better, and more thorough training of ground personnel is essential

The closer the deicing takes place near the runway the better off you'll be

I think requiring after deice for a pilot to go back to the cabin over-wing view location is ABSURD. This takes all common sense judgment out. Also if you pull out off deice and are cleared for T/O this further delays T/O and exposes to falling precip. -DUMB-

Deicing near the end of runway with a takeoff clearance shortly thereafter seem to be the safest operation. I am very uncomfortable making an assessment of icing on the wing at night time or during heavy

Require all deice equipment/personnel to be stationed at the end of the runway

Deice at the end of the runway, not at the gate

Make the training more aircraft specific

I read an article in FLYING Magazine that talked about tail icing which I thought was very informative about unheated tail surfaces. I would like to see more

information on engine anti-icing. For example, depending on LT or MOD icing we use a minimum throttle position (N1) along with engine anti-ice to prevent ice formation on the turbine. This is when icing is detected or suspected. However, if we are in visible moisture and $OAT \leq 10^{\circ}C$ but icing is not detected (i.e., on the wipers. We may pull the throttles to idle, is a good idea? What is some guidance? Seems like engine icing should be as much concern as wing icing. The key, I think, is education, education, education, like _____ vs. clear, conducive temp for icing, etc.

Just what I already mentioned - I wish they would only use Type II or Type IV and ask us PRIOR to applying it, which one we want

Need better training to recognize fluid failure. Need better training to determine freezing rain/drizzle protection for takeoff

This wasn't a good year to evaluate deice effectiveness.

Too mild. Training can always be evaluated, though.

Better views of actually fluid failures would help recognition

I think it's quite possible to over-regulate this area of aviation - just like anything else. Let's leave room for judgment

I think overhead lights (like street lights) would help with the final inspection (done from the cabin) out near the departure end of the runway

Deicing at the hold short/or very close to the hold short, and tower coordination with each departure.

Coordination with the deicers via ground or some other communication vehicle

The most effective deicing is at the departure end of the runway just prior to departure

Wee need to educate our ground personnel who often think we need to be deiced when in fact we do not! Just because they can see snow on the wing does not mean we MUST get deiced. If t is 5 F that snow is NOT adhering to the wing and will blow off. I appreciate their help especially @ nigh but I think after 20 years of flying in cold WX ops my opinion as Capt. should count for something. If I have any doubts I will get sprayed. But if I can reasonably inspect my own aircraft I resent being told to get _____. Personally, I think we have gone overboard in spraying airplanes that probably do not need to be sprayed.

More deice at or near end of runways. Useful visual info on fluid failure. Better lighting to assess condition of wing. Some way to clean the windows used for visual inspection (or have an inspector placed at end of rwy who can do the inspection from outside the aircraft) - what a miserable job that would be!

Deicing would be much easier/safer if the deicing was done at the end of the runway when #1 or #2 for takeoff

Placing a qualified observer at the runway end to inspect all a/c prior to takeoff would be the best improvement (during icing conditions)

The stupidest thing we do is go to remote pad truck deicing - all USA airports in potential icing areas should have "car wash" + GO. The other dumb thing we do is deice when it's 20 F + LT snow flurries - The flurries will

- blow off the wing surface prior to 20 knots in my estimation
- Need more training with the visual aspects of Type II & IV fluids
- It is getting better out here - keep the education coming
- The "clean aircraft concept" has been over-indulged. Frost or light ice on the radome of an ATR isn't going to hurt anything, but having the windshield & windows obscured by this viscous "glop" is a real hazard. After deicing you can't see the wings at all and your only forward vision is through a small hole smeared by wipers. Then you have to taxi in a congested area & during T/O fluid from the nose streams up over the windshield
- Yes, deice at runway just prior to takeoff
- Program has really improved over years. Wing ice detectors would be great
- If in doubt, deice; ask for ice check by mechanic at gate with ladder. If in doubt after deice & waiting for T/O, visual check. Any doubts - re-deice
- Need more training on recognizing fluid failure. Need more illumination of wing for night inspections
- Obviously what is needed is a drive-thru system located at the end of the runways with a catch basin for recycling fluid. The idea is to minimize the time from completion of deice/anti-ice to takeoff
- Deicing should take place at the end of the runway
- Take your time - slow down. Make every effort to have a/c completely clean prior to T/O. There's no turning back after T/O. Be sure
- Wider use of optical viewers by trained ground crew at a point just prior to takeoff would greatly enhance aircraft and PAX safety, not to mention crew comfort
- Personal visual actual physical examination of affected surfaces is most effective detector and should be utilized whenever possible
- For D3, If I remember correctly, (see graph on form)
>where type/amount intersected, one had a range of acceptable time. When time expired, one still had 5 min pre-contamination (5 min) check. My opinion,
- Deicing just prior to T/O is VERY important. Trust in the judgment of deicing personnel is a must - I find deicing crews very conscientious and competent. The deicing procedures used at St. Louis I have
- Try to stay informed and assess actual conditions on a case by case basis conservatively
- 1997-98 was a mild winter - many of the improvement have yet to be tested
- Procedures involved for significant icing must eventually go to generic airfield end of runway operations
- Need visual training devices, mainly need more time spent in ground/recurrent training-as with all other systems operational questions
- Yes, fight the God damned EPA and establish deice stations where they should be, at the end of every departure runway. Let's wake up and employ some good old common sense!
- Deicing only to suffer a 30 min T/O delay creates a situation where holdover times are exceeded and crews are routinely faced with having to make re-deicing decisions. Remote pad deicing or gate departure
- GROUND: Simplified checklists for the aircrew (when to deice/what to do). AIR: Emphasis on what icing conditions are, AFM procedures for icing (what to do-what NOT to do). Stress PIREPS's. I feel that weather and weather hazards has always been the weakest area of any flying course, military or civilian. KEEP IT SIMPLE! Good survey
- See attached discussion. (Letter attached)
- If possible actual icing failure visually seen in person would be good, especially with the new Type IV military fluid being used
- My greatest concerns are training of personnel especially at outstations. Also info on Type IV and fluid failure
- Any sensors that may be installed need to be very reliable and work airborne to be of any value. With a large area in question (the wing) sensors will only indicate spot locations. I see this as their limitation. I would really like to see a final deice/anti-ice stand at end of runway capable of covering entire a/c within 2 min. before T/O
- Lots of media attention focused on icing accidents and I find many pilots deice unnecessarily. CYA
- The FAA should keep a better watch on outstation personnel and equipment. They seem to only care about the hub
- Difficult to detect from either vantage point. I have limited experience with Type IV fluid, but it seems very effective. We operated with a "clean aircraft" policy and anytime any ice is detected we deice. The only problem I could identify is with new and inexperienced deice operators. I believe some type of a test should be developed to ensure competent deice operators. Thank you
- I believe that the authority should always be with the PIC
- I would like to see ice detectors on the wing and horizontal stab, also threshold deicing
- If you could simulate a wing surface in a large cold storage facility - you would be able to demonstrate actual fluid failure when a pilot were to actually see fluid failure - it becomes much easier to identify.
- Again - a qualified person giving a visual/tactile inspection at departure end would be a great help - especially at night
- Make procedures for observing quality of deice personally & its training program
- A video of actual icing and examples of the failure of anti-icing fluids
- Awareness, equipment, fluids and personnel have greatly improved during the past 10 years- but for anyone who followed the basic FAR regarding operating on aircraft with ANY snow or ice adhering to its .
- ..., safety of the operation hasn't changed. It was just as safe in the old days if you followed the rules
- Deicing checks external at the departure end of the runway Could be vastly improved
- All deicing/anti-icing stations should be at the runway end
- Deice prior to takeoff at runway departure end
- I'm beginning to think we've gone overboard i.e. applying too much fluid when not needed
- The only weak link in the system is identifying fluid failure at night in poorly lit conditions. Wing sensors would be a big help in alleviating this weakness

Deice by end of runway, clean surface inspection by expert outside of airplane. In cockpit sensing device would be great!

Thanks for your hard work Dave

See separate sheet.

1)Deice as close to departure point as possible (remote deice). 2)Type II at places that get FREEZING rain/drizzle. 3) Remember, FAR's reference ADHERING this is the key in deice decision

The FAA and/or the airports and/or the airlines should pool their resources and have a car wash type deicing operation at the end of runway right before T/O. If this were done all the above would not be of such great concern. FAA provides air traffic control for all airlines why couldn't they do the same with deicing. More efficient & SAFER!

Operations during deicing has been greatly improved.

However, we've gotten to the point where I often see aircraft with totally clean wings going through deice. It's safe where it is, don't need more regulations in this area!

My experience is that ground crews are frequently spraying the a/c when NOT needed but then using Type I fluid when Type II or IV IS needed. In summary, we need to use Type I less and Type IV more

The aviation community has overreacted to a few incidents/accidents. 999/1000 pilots make good judgment calls without all of this specific guidance. Detectors of some variety would however be helpful

A lot of emphasis is placed on deicing procedures (which are complicated) and which differ from the way things are actually done on line. No instruction is actually given on fluid failure modes or the reliability of HOT calculations under various changing WX conditions (other than the usual "improving WX" or "worsening WX")

Ground crews seem to be better educated (past 2 years).

The advent of Type IV fluid is much better

Checking for ice/freezing contamination B-4 takeoff AT NIGHT is very difficult if not impossible. Deice fluid & glare combine to create a "guessing" situation

Should be done as in Europe, right before taking active for takeoff

I've got a story for you. It's Jan. and we're in LAS. We are the first flight to DEN and it's before sunrise. Temp is 36, Dew point is 33, weather is down in DEN. Co-pilot does the walk around. He doesn't mention frost on the wing or do I think he even looked. Remember we're in LAS. I got my first cup of coffee and went back to look at the wings from inside. We had frost on the entire top of one wing & a shit load on the other. I've never seen that much, I called to be sprayed. I was told we didn't have any one who could spray our aircraft. I called our maintenance dept. and said if they couldn't contact a outsider vendor to spray us we couldn't go, I also said if they horsed around any longer the sun would melt it off. They liked that idea. I taxied out turned my tail to the rising sun and sat there for 40 minutes. The wings cleared off enough that I figured it would fly, (I made the last check), and away we went. The best part about this story is while we sat there 15 other Jack asses took

off. Do you thing I was the only plane with frost that morning or the only one who looked.

The new enclosed cabs on some of the deice trucks are great for protection of deice crews - protection helps with the thoroughness of the deice procedure

For reasons stated in C11, a reliable sensor system for icing should be the ultimate goal

1)More must be done to inform pilots and management of what condition the a/c is certified to fly in and how these non-certified conditions may prohibit or reduce operations. 2)Ground deicing seems to become a casual procedure the requirement of how to correctly accomplish the procedures seems to be less important than it did 5 years ago

It will take another major accident before we start deicing at the end of the runway. It would be so easy; but I guess too expensive without the public pressure. FAA tombstone rulemaking

Quick dissemination of Pireps in flight I would like to see a visual indicator on wing to aid us in estimating accumulation on the ground check. Gate deicing seems to reduce overall delays. Just use the pads if there is a long line for T/O, and a second shot is required some airports (ORD) don't seem to have the pads manned at all. Some (DEN) use just the pads, and I think that causes most of DEN delay

We need more remote pad deicing near departure runways Perhaps a review sponsored by the Company on the latest technology regarding deicing/anti-icing with visual aids. Not just printed material for us to read

Many points raised in this survey, i.e. HOT, surface inspections, fluid conditions, etc., would be unnecessary if we did remote pad deicing just prior to T/O instead of deicing on the gate. We have build deice pads at many large airports so it would seem that failure to use this procedure is a failure of will or matter of local politics. Before we spend fortune on wing sensors, try simple procedure

No procedure can substitute for solid common sense sometimes the best thing is not to deice but at least in the US we are to using fluid, even when would be much faster & better. Due to FAA, action of fear of same, we often deice when not really needed

A video tape on failed fluids and a better understanding of proper application procedures

The wing mounted fluid failure sensor is an excellent idea. For now, the 2 most important things contributing to safety are 1) deicing at or near departure end of runway, and 2) making Type II & IV available at ALL airports

Deicing should be done in an area or taxiway just before entering runway for T/O

Better training for ground personnel especially in the outlying stations. A lot of times at these outlying stations you get the feeling that the station manager is paying for the deicing fluid out of his own pocket - (i.e., A20)