
Office of the Inspector General Inspection Report

***REPORT ON
FAA DEICING PROGRAM AT LA GUARDIA AND
O'HARE AIRPORTS***

*Report Number E5-FA-7-002
Date: October 2, 1996*



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**Prepared by the
Office of Assistant Inspector General for
Inspections and Evaluations
Office of Inspector General
Department of Transportation**

CONCLUSION

The Office of Inspector General, Department of Transportation, conducted a followup inspection of the Federal Aviation Administration (FAA) Deicing Program. We initiated this study to observe deicing operations as a followup to our report on the FAA Deicing Program, (No. E5-FA-7-001, dated October 2, 1996). The objective of this inspection was to determine if deicing operations at selected airports were in compliance with FAA regulations.

At the two airports--La Guardia Airport, New York, New York, and O'Hare International Airport, Chicago, Illinois, where we observed deicing operations, we found deicing operations are in compliance with FAA Deicing Program regulations. For example, air carriers canceled, or delayed, flights because of adverse weather; aircraft appeared to be free of snow and ice at takeoff; air carriers at O'Hare were using new, longer lasting anti-icing fluids that increase holdover times (i.e., the elapsed time before an aircraft must repeat deicing fluid application); and FAA, airport operators, and air carriers were working together to avoid expired holdover times for aircraft.

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BACKGROUND

FAA amended Federal Aviation Regulation (FAR) Part 121.629, "Aircraft Ground Deicing and Anti-Icing Program," on September 29, 1992. The amended regulation requires each air carrier operating under FAR Part 121,¹ "Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft," to follow an FAA-approved deicing program requiring: (1) flight and ground crew² deicing training, (2) establishment of operational holdover times,³ and (3) specific aircraft checks when holdover times expire. Table 1 provides an overview of deicing responsibilities.

Table 1: Deicing Responsibilities

Organization		Responsibilities
FAA	Flight Standards Service	<ul style="list-style-type: none"> • Develop deicing regulations. • Approve air carrier deicing programs. • Conduct surveillance of air carriers.
	Air Traffic	<ul style="list-style-type: none"> • Manage the flow of aircraft to minimize the time from deicing to takeoff. • Coordinate with air carriers and airport management during icing conditions.
	Airports	<ul style="list-style-type: none"> • Prioritize requests for Federal funds to ensure deicing projects receive top priority.
Airport Operators		<ul style="list-style-type: none"> • Develop local deicing plans. • Ensure snow-free runways. • Determine need for remote deicing facilities and request Federal funds. • Determine environmental impact of deicing.
Air Carriers		<ul style="list-style-type: none"> • Develop air carrier deicing programs in accordance with FAR 121.629.

¹ **FAR Part 121 air carrier**--a carrier operating large aircraft with a seating capacity of more than 30 passengers.

² **Ground crew**--air carrier personnel who work on the aircraft (i.e., mechanics) but are not involved in its operation.

³ **Holdover time**--estimated time deicing or anti-icing fluid will prevent the formation of frost or ice and the accumulation of snow on the protected surfaces of an aircraft. Holdover time begins when application of a deicing or anti-icing fluid commences and expires when the deicing or anti-icing fluid applied to the aircraft loses its effectiveness.

SCOPE AND METHODOLOGY

We selected 10 airports and 5 alternate airports to visit, depending on suitable weather conditions. These airports were selected because of the level of airport activity (i.e., number of aircraft departures) and the likelihood of snow during the winter season. The OIG team planned to assemble at these preselected airports before a forecast snow storm to observe, first hand, deicing operations at the airports. Because of the difficulty in predicting icing conditions and coordinating travel to the airports, we observed deicing operations only at La Guardia Airport, New York, New York, and O'Hare International Airport, Chicago, Illinois, during the 1995-96 winter season. This review was conducted in accordance with the President's Council on Integrity and Efficiency Quality Standards for Inspections.

Interviews and Document Reviews

We discussed deicing operations with various personnel, including airport operators, air carriers, and FAA personnel from Flight Standards Service and Air Traffic (refer to appendix A). We also reviewed various documents, including airport deicing plans, air carrier deicing programs, and the Aviation Safety Reporting System database to understand how deicing should function.

Prior Coverage

Two studies addressing aspects of the amended deicing regulation, listed in appendix B, served as reference points for this inspection.

OBSERVATION RESULTS

We observed deicing operations at two major airports during winter storms in 1995-96. Because of weather-related flight disruptions and improving weather conditions, our observations were limited to a small number of aircraft at each airport. In both cases, air traffic balancing and departure metering were not necessary to avoid departure delays, and all aircraft we observed took off within holdover times and were free of snow and ice.

DEICING OPERATIONS AT BOTH AIRPORTS ENSURED AIRCRAFT WERE FREE OF SNOW AND ICE AT TAKEOFF.

Winter Storms at Two Airports

La Guardia Airport. The OIG team observed deicing activity during a snow storm at La Guardia Airport. According to the 1995 USA Today Weather Almanac, La Guardia averages 28 inches of snow a year, with 28 days of snow. The weather forecast for New York was 10 to 12 inches of snow for a 3-day period (Friday, February 2, 1996, through Sunday, February 4, 1996). The forecast predicted snow to begin on Friday morning and continue until mid-day Sunday.

We arrived at the airport on Saturday morning about 7:30 a.m., to observe deicing from the terminal. Upon our arrival at La Guardia, snow was falling and the temperature was about 23 degrees Fahrenheit. The snowfall decreased and ended about 8:00 a.m. However, because of the number of canceled and delayed flights, we had difficulty locating aircraft being deiced. The first deicing we observed began about 8:30 a.m. The inspection team ceased observations at 10:00 a.m. because the snow had stopped and deicing was discontinued.

O'Hare Airport. The OIG team observed deicing activity during a snow storm at O'Hare Airport. According to the 1995 USA Today Weather Almanac, O'Hare averages 39 inches of snow a year, with 62 days of snow. The weather forecast for Chicago was 5 to 6 inches of snow for Wednesday, March 6, 1996. The forecast predicted snow to begin late Wednesday morning and continue until the evening.

We arrived at the airport on Wednesday afternoon about 2:00 p.m. to observe deicing from the terminal. Upon our arrival at O'Hare, snow was falling and the temperature was about 28 degrees Fahrenheit. The snowfall tapered off about 10:00 p.m. However, because of the number of canceled flights, we had difficulty locating aircraft being deiced. The first deicing we observed began about 3:00 p.m. The inspection team ceased observations at 4:15 p.m. because the snow had ended and most flights had been delayed until after 5:00 p.m.

Air Traffic Balancing and Metering

La Guardia Airport. The La Guardia Deicing Desk coordinator⁴ is responsible for activating La Guardia's deicing plan, notifying the Air Traffic Control Tower (ATCT), and assigning departure slot allocations to La Guardia air carriers. According to a Delta official, the decision to activate the deicing plan is a judgment call, with no specific conditions triggering the plan. The Deicing Desk may trigger the plan when the airport is experiencing icing conditions, deicing operations are occurring, or aircraft cannot take off within holdover times during normal operations.

When the La Guardia Deicing Plan is activated, the La Guardia ATCT Traffic Management Unit (TMU) Coordinator notifies the New York Terminal Radar Approach Control (TRACON), Air Route Traffic Control Center, and FAA Air Traffic Control System Command Center. The TMU coordinates with these facilities to establish a modified arrival and departure rate for La Guardia. The rate will depend on the number of available runways, accurate traffic data from the New York TRACON, and current weather conditions.

The La Guardia Deicing Desk coordinator is also responsible--upon activation of the Deicing Plan--for assigning departure slot allocations to La Guardia air carriers. After TMU limits the number of departing and arriving aircraft into La Guardia, the Deicing Desk coordinator then allocates, using a computer program, the limited number of departure slots among the La Guardia air carriers. The Deicing Desk subsequently notifies the ATCT of those aircraft included in the Departure Allocation Program by identifying the aircraft call sign and destination. Afterward, only those aircraft that have been given departure approval by the Deicing Desk will contact the ATCT for taxiing instructions. Taxiing instructions are not given to unapproved aircraft. In addition, the Deicing Desk notifies the ATCT of any pertinent information that will affect aircraft movements at La Guardia Airport, such as snow removal.

During our observation on February 3, 1996, departures were not metered because air carriers canceled a number of flights and the airport was operating at only about 40-percent capacity (i.e., approximately 15 operations per hour compared to the norm of approximately 38). According to departure monitors, for example, one major air carrier had 25 scheduled departures between 9:00 a.m. and 10:40 a.m. The air carrier canceled 5 (20 percent) and delayed 7 (28 percent) of its departures. This flight reduction eliminated the chance for ground delays and expired holdover times caused by large numbers of aircraft waiting in line for takeoff.

O'Hare Airport. Unlike La Guardia, O'Hare does not use a deicing desk coordinator due to differences in airport size, traffic, and layout. At O'Hare, the O'Hare ATCT Manager initiates a conference call to the Air Traffic Control System Command Center (Center) to notify the Center of the implementation of the O'Hare Deicing Plan. The O'Hare ATCT Manager also notifies the Center that aircraft departing O'Hare should be exempted from the En Route Spacing Program⁵ and Expected Departure Clearance Times.⁶ The Center subsequently reduces the arrival rate into O'Hare from other airports across the country by delaying the departure of flights scheduled to fly into O'Hare.

⁴ The Deicing Desk is staffed by air carriers at La Guardia on a rotational basis. During the 1995-96 winter season, Delta Airlines provided the coordinator and during the 1994-95 winter season, Continental Airlines provided the coordinator.

⁵ **En route Spacing Program**--a program designed to safely separate aircraft flying busy air routes.

⁶ **Expected Departure Clearance Time**--runway release time assigned to an aircraft by the ATCT. It is utilized to hold an aircraft on the ground at the airport of origin in order to avoid air, or ground, congestion at the destination airport.

Based on our observations, the ATCT Manager's balancing of arrivals and departures is effective. The arrival rate into O'Hare was considerably reduced during our observation on March 6, 1996. The O'Hare Director of Airport Operations estimated FAA reduced the O'Hare arrival rate by 60 percent during the height of the snow storm. Supporting this estimate, we observed that air carriers canceled, or delayed, most flights between 1:00 p.m. and 5:00 p.m. For example, table 2 shows delays and cancellations we observed on the departure monitors of a major air carrier.

Table 2: O'Hare Flight Delays and Cancellations

Time	Total Flights	Delays	Cancellations
2:45 p.m.	165	59 (36%)	33 (20%)
3:03 p.m.	165	78 (47%)	29 (18%)
4:15 p.m.	165	62 (38%)	51 (31%)

When the O'Hare ATCT Manager expects departure delays to consistently exceed 15 minutes, the Manager determines appropriate arrival and departure rates to balance airport traffic and reduce departure delays. The O'Hare ATCT Manager then notifies air carrier representatives of the start of the Departure Allocation Program and their respective air carrier departure allocations. The O'Hare ATCT Manager considers the current aircraft arrival rate, the current snowfall, and the forecast snowfall when determining the appropriate departure rate. However, the Manager does not have to rigidly adhere to the designated departure rate and will allow more aircraft to depart if runway conditions permit.

Once the O'Hare ATCT Manager implements the Departure Allocation Program, each air carrier is responsible for only releasing its allocated number of departing aircraft. For example, if the O'Hare ATCT establishes an hourly departure rate of 20 aircraft, all air carriers will jointly be limited to 20 aircraft departures per hour. The airport authority will allocate a majority of the 20 departure slots to the two largest air carriers at O'Hare, dividing the remaining slots among the rest of the O'Hare air carriers.

According to Chief of O'Hare Airport Operations, O'Hare did not use the Departure Allocation Program during the 1995-96 winter season. The ATCT Manager has been able to adequately balance aircraft arrivals and departures to consistently avoid departure delays over 15 minutes. In addition, the mild winter season and the increased use of more effective anti-icing fluid has enabled the ATCT Manager to consistently avoid departure delays over 15 minutes. During the snow storm on March 6, 1996, for example, we observed no lines of aircraft waiting for departure clearance.

Deicing Observations

La Guardia Airport. During the winter storm on February 3, 1996, we observed the airport deicing operations, including three aircraft being deiced. Air carriers at La Guardia normally deice at the gates (passenger boarding area), but a secondary deicing area (deicing pad) also exists. The airport operator uses the overnight aircraft parking area west of the "Echo" taxiway as a secondary deicing site. During icing conditions, Air Traffic routes departing aircraft by the designated secondary deicing area in case aircraft need secondary deicing prior to takeoff. Airport operator officials estimate only one aircraft in the last 2 years used the deicing pad because: (1) air carriers are responsible for collecting glycol⁷ at new facilities,⁸ and (2) air carriers do not use the deicing pad if an aircraft can make it to the end of the runway within a few minutes of being deiced at the gate.

⁷ Glycol collection prevents fluid from getting into a waterway. To collect glycol, an air carrier may plug the storm drains in a deicing area and vacuum up the fluid or build a special deicing pad with a catch basin which allows deicing fluid to flow directly into a retention tank.

During our observations, aircraft did not leave the takeoff queue for secondary deicing, in part because the snow had stopped. Aircraft we observed waited approximately 10 minutes in the runway queue before takeoff. On the basis of our observations, it took the three aircraft an average of 18 1/2 minutes from the time of gate departure to takeoff.

O'Hare Airport. During the winter storm on March 6, 1996, we observed the airport deicing operations, including three aircraft being deiced. According to an O'Hare air carrier representative, several major air carriers are currently using a new, more effective, anti-icing fluid called ULTRA. However, some air carriers continue to utilize the older, less effective, Type II anti-icing fluid in order to deplete inventories before purchasing ULTRA. Created by Union Carbide, ULTRA has a green tint when applied to an aircraft surface and is approximately 50 percent more effective than the older Type II fluid. In September 1995, FAA approved revised holdover timetables that incorporated holdover times for aircraft utilizing ULTRA. As shown in table 3, undiluted applications of ULTRA increase aircraft holdover times from 10 to 30 minutes.

Table 3: Holdover Time Differences in Snow Conditions⁸

Outside Air Temperature	Fluid Concentration	Type II Holdover Time	Ultra Holdover Time	Difference
above 32	100/0	0:25-1:00	0:37-1:30	0:12-0:30
	75/25	0:20-0:45	0:20-0:45	-0-
	50/50	0:15-0:30	0:15-0:30	-0-
32 to 19	100/0	0:20-0:45	0:30-1:07	0:10-0:17
	75/25	0:15-0:30	0:15-0:30	-0-
	50/50	0:05-0:15	0:05-0:15	-0-
Below 19 to 7	100/0	0:20-0:45	0:30-1:07	0:10-0:17
	75/25	0:15-0:30	0:15-0:30	-0-

Air carriers currently using ULTRA find it easier to avoid the expiration of holdover times before takeoff. For example, in snow conditions, an aircraft sprayed with a 100-percent concentration of ULTRA can safely wait over 1 hour before requiring an "outside-the-aircraft" check or a second deicing. Assuming Air Traffic, airport authorities, and air carriers continue to reduce departure delays at U.S. airports, an aircraft sprayed with ULTRA will rarely encounter the dangers of expired holdover times and ice accumulation.

In our three deicing observations, we could not verify whether flight crews checked the aircraft exterior, because the flight crews were already in the cockpit preparing for departure. However, we observed the ground crews checked the aircraft for ice and used deicing trucks to spray Type I fluid and ULTRA on the nose, fuselage, and engines. In addition, ground crews used ladders for closer examination of the wings of MD-80's.¹⁰ If necessary, the ground crews reapplied ULTRA to the wings and tail. Ground crews completed aircraft deicing with Type I and ULTRA in an average of

⁸ Although La Guardia has designated an existing overnight aircraft parking area as a secondary deicing site, it is a new use for the facility, because deicing has not been previously performed there. As a result, according to airport operator officials, the secondary deicing site is considered a new deicing facility by the Environmental Protection Agency and is therefore subject to more stringent requirements than existing deicing areas--such as the collection of glycol by air carriers.

⁹ This information was taken from Flight Standards Information Bulletin (FSIB) for Air Transportation (FSAT) number 95-21A, dated September 25, 1995.

¹⁰ MD-80's are susceptible to clear ice buildup on the leading edge of their wings.

16 minutes. The three aircraft we observed left the gate area free of snow and ice. The aircraft then had approximately 51 minutes to taxi to a runway and take off before their holdover times expired.

Because of poor visibility, however, the inspection team had difficulty verifying whether the aircraft took off within their holdover times. One of the observed aircraft departed from the gate area approximately 25 minutes after the first application of Type I fluid. Mechanical problems with one deicing truck and the addition of baggage and passengers delayed aircraft departure from the gate. Although the aircraft had a holdover time over 1 hour, air carrier personnel could have significantly reduced the possibility for an expired holdover time by finishing the deicing fluid application more quickly or by not boarding any passengers after initial deicing.

¹¹ According to the O'Hare Deicing Plan, Air Traffic attempts to keep departure delays for deiced aircraft below 15 minutes.

APPENDIX A

ACTIVITIES VISITED OR CONTACTED

AIR CARRIERS

American Airlines, Chicago, IL
American Airlines, New York, NY
Delta Airlines, New York, NY
Trans World Airlines (TWA), St. Louis, MO

AIRPORT OPERATORS

Chicago-O'Hare International Airport, Chicago, IL
Port Authority--La Guardia Airport, New York, NY

FEDERAL AVIATION ADMINISTRATION

Air Traffic Control

La Guardia Airport, New York, NY

Flight Standards District Office

Flight Standards District Office, Garden City, NY
Flight Standards District Office, Schiller Park, IL
Flight Standards District Office, St. Ann, MO

PRIOR COVERAGE

Office of Inspector General

FAA Deicing Program (No. E5-FA-7-001, October 2, 1996). OIG reviewed how the changes to FAR Part 121.629, "Aircraft Ground Deicing and Anti-Icing Program," improved air safety during icing conditions. OIG determined FAA: (1) is inconsistent in approving how air carriers interpret and implement deicing regulations, (2) does not adequately analyze results of its deicing inspections to improve the safety of air carrier deicing operations, (3) has shortfalls in its method of selecting special emphasis airports and in its airport operator regulations, (4) has little impact on facilitating the construction of deicing facilities, and (5) lacks technical, in-house icing expertise.

General Accounting Office

New Regulations for Deicing Aircraft Could Be Strengthened (GAO/RCED-93-52, dated November 1992.) At the request of the Ranking Minority Member, Subcommittee on Transportation and Related Agencies, Senate Committee on Appropriations, GAO was asked to: (1) determine FAA progress in developing new deicing regulations, (2) describe the manner in which the new regulations address safety concerns, and (3) identify any areas needing improvement. GAO determined FAA regulations are a positive step toward ensuring safe ground operations for aircraft during deicing conditions. However, additional actions could further ensure safety by requiring checks for ice be performed outside the aircraft, and verifying that airline personnel have received and understood the initial training material on the new regulations.

APPENDIX C

ACRONYMS

ATCT	Air Traffic Control Tower
Center	Air Traffic Control System Command Center
DOT	Department of Transportation
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FSIB	Flight Standards Information Bulletin
FSAT	FSIB for Air Transportation
OIG	Office of Inspector General
TMU	Traffic Management Unit
TRACON	Terminal Radar Approach Control

APPENDIX D

INSPECTION TEAM MEMBERS

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