

APPENDIX H

AIRPORTS





Boarding plane



Airport terminal



Gate area



Parking garage

AIRPORTS

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SUMMARY

The United States has the world's most extensive airport system, which is essential to national transportation. Airports, which are among the most important and widely used facilities, play a major role in generating economic activity for the United States. According to the Bureau of Transportation Statistics, in 1999, there were 5,324 public-use airports and 13,774 private-use airports in the United States. The airports used by the scheduled air carriers are virtually all public facilities run by an agency of a state or local government, or a commission or port authority established by the state legislature. Since airports resemble small cities, they are organized accordingly, with departments for purchasing, engineering, finance, administration, etc.

A typical airport infrastructure is relatively complex, and components that might be subject to corrosion include the natural gas distribution system, jet fuel storage and distribution system, deicing storage and distribution system, water distribution system, vehicle fueling systems, natural gas feeders, dry fire lines, parking garages, and runway lighting. Generally, each of these facilities is owned or operated by different organizations and companies, and the impact of corrosion on an airport as a whole is not known or documented; however, the airports do not have any specific corrosion-related problems that have not been described in other sectors, such as corrosion in water and gas distribution lines, corrosion of concrete structures, and corrosion in aboveground and underground storage tanks.

Because of the diversity of airport facilities and different accountabilities, the costs due to corrosion are not apparent and, therefore, cannot be addressed in a systematic manner. In order for airports to reduce and control their corrosion costs, it is recommended that the airports establish databases that will allow engineers to track corrosion and corrosion costs and raise awareness.

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SECTOR DESCRIPTION

The United States has the world's most extensive airport system, which essentially consists of national transportation, commerce, and defense. Airports, which are among the most important and widely used facilities, play a major role in generating economic activity for the United States. Specifically, U.S. airports handle more than 3.2 million passengers and 38,000 metric tons of cargo each day.⁽¹⁾ As a result of this considerable passenger and cargo capacity, airports accrue an annual \$380 billion in total economic activity nationwide. There are 1.6 million jobs at airports in the United States, with an additional 4.2 million jobs created in local communities. These jobs translate into total annual earnings of \$155 billion. Moreover, airports generate \$31.2 billion in local, state, and federal taxes.

According to the Bureau of Transportation Statistics, there were 5,324 public-use airports and 13,774 private-use airports in the United States in 1999 (see table 1).⁽¹⁾

Table 1. U.S. airport statistics.⁽¹⁾

	1980	1985	1990	1998	1999
Public Use					
% with lighted runways	66.2	68.1	71.4	74.8	76.1
% with paved runways	72.3	66.7	70.7	74.2	74.2
TOTAL	4,814	5,858	5,589	5,352	5,324
Private Use					
% with lighted runways	15.2	9.1	7.0	6.3	6.7
% with paved runways	13.3	17.4	31.5	33.2	31.8
TOTAL	10,347	10,461	11,901	13,418	13,774
TOTAL AIRPORTS					
	15,161	16,319	17,490	18,770	19,098
Certified					
Civil	ND	ND	ND	566	566
Military	ND	ND	ND	94	94
TOTAL	730	700	680	660	660

ND - not determined

Air transportation is the fastest growing transportation mode in the United States. Domestic passenger-miles of air travel more than doubled since 1980, while ton-miles of freight carried by air increased threefold. Airway system mileage increased from 545,600 km (341,000 mi) in 1980 to 630,400 km (394,000 mi) in 1995 (no estimates are available for 1996 and 1997).⁽¹⁾ Certified airports (those serving scheduled air carrier operations with aircraft seating more than 30 passengers), with virtually all of the passenger traffic and with the bulk of it concentrated in the 29 large hubs (75 airports), handled 431 million enplaned passengers in 1997. The top 10 busiest airports in the United States, on the basis of passenger enplanement, are listed in table 2.

The airports utilized by the scheduled air carriers are mostly public facilities run by a state or local government agency, such as the department of transportation, or a commission or port authority established by the state legislature and governed by a board of directors appointed by elected officials. Since airports resemble small cities, they are organized like a small city, with departments for purchasing, finance, engineering, etc.⁽²⁾ They also have fire and police departments and handle such municipal duties as trash and snow removal.

Table 2. Top 10 busiest airports in the United States (1999).⁽³⁾

RANK	LOCID	AIRPORT NAME	ASSOCIATED CITY	ST	ENPLANEMENTS
1	ATL	William B. Hartsfield	Atlanta	GA	38,136,866
2	ORD	Chicago O'Hare Intl	Chicago	IL	34,050,083
3	LAX	Los Angeles Intl	Los Angeles	CA	30,830,915
4	DFW	Dallas/Fort Worth Intl	Dallas-Fort Worth	TX	27,990,212
5	SFO	San Francisco Intl	San Francisco	CA	19,249,988
6	DEN	Denver Intl	Denver	CO	18,039,836
7	DTW	Detroit Metropolitan	Detroit	MI	16,982,496
8	EWB	Newark Intl	Newark	NJ	16,927,048
9	PHX	Phoenix Sky Harbor Intl	Phoenix	AZ	16,781,835
10	MIA	Miami Intl	Miami	FL	16,531,295

AREAS OF MAJOR CORROSION IMPACT

A typical airport infrastructure is relatively complex, and the components that might be subject to corrosion include the following:

- Natural gas distribution system.
- Jet fuel storage and distribution system.
- Deicing storage and distribution system.
- Water distribution system.
- Vehicle fueling systems.
- Natural gas feeders.
- Dry fire lines.
- Parking garages.
- Runways and runway lighting.

Generally, each of these infrastructure components is owned and/or operated by different organizations and companies. Given the above, airports do not have any specific corrosion-related problems that cannot be found in other sectors of the national economy (e.g., corrosion of heat, ventilation, and air-conditioning systems; corrosion of a reinforced-concrete floor in a parking garage; or corrosion of buried metallic structures). The latter issue, corrosion of buried metallic structures, is primarily manifested in underground storage tanks (USTs) or buried fuel lines transporting fuel from the tank farms. Larger airports generate considerable volumes of wastewater during the deicing season and may have wastewater treatment facilities (which often are not owned by the airports).

The issue with USTs became particularly acute with the passing of an Environmental Protection Agency (EPA) regulation deadline in 1998, which mandates installation of corrosion protection on existing regulated USTs (see Appendix G, Hazardous Materials Storage).

Considering that the scope of the problem is rather limited, there is no available information on corrosion control costs. For the most part, these costs are contained within the maintenance budgets, but are not tracked separately. To complicate the issue, in many cases, the structures subject to corrosion, such as tank farms, while technically owned by the airports, are leased by the airport tenants. The sources of funds are multiple, including rent

and gross-receipt fees paid by the airport-based businesses, landing fees, and sometimes parking and fueling fees paid by the airlines. Sometimes a structure, such as a parking garage, is built for exclusive use by an airline and, therefore, is owned and maintained by it. Furthermore, outside contractors often perform whatever corrosion control maintenance is scheduled. Because a basis was not identified to estimate corrosion-related cost, no estimates were made. Given the lack of information on the subject, no estimates of corrosion-related costs were attempted.

REFERENCES

1. U.S. Bureau of Transportation Statistics data, 1999.
2. Chapter 7, Airports, *Airline Handbook*, www.air-transport.org, June 2000.
3. FAA DOT/TSC ACAIS database, 1999.