U. S. Air Carrier Operations
Calendar Year 2004

ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA

NTSB/ARC-08/01

PB2008-108720

National Transportation Safety Board

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Annual Review of Aircraft Accident Data

U.S. Air Carrier Operations, Calendar Year 2004

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Abstract: The National Transportation Safety Board's Review of Aircraft Accident Data: U.S. Air Carrier Operations Calendar Year 2004 covers aircraft operated by U.S. air carriers under Title 14 Parts 121 and 135, of the Code of Federal Regulations (CFR). Air carriers are generally defined as operators that fly aircraft in revenue service. Data for the years 1995–2003 are included to provide an historical context for the 2004 statistics. Much of the information in this review is presented in graphs and tables. Readers who prefer to view or manipulate tabular data may access the data set online at http://www.ntsb.gov/aviation/stats.htm.

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INTRODUCTION

The National Transportation Safety Board's Review of Aircraft Accident Data: U.S. Air Carrier Operations Calendar Year 2004 covers aircraft operated by U.S. air carriers under Title 14[1] Parts 121 and 135, of the Code of Federal Regulations (CFR). Air carriers are generally defined as operators that fly aircraft in revenue service. Data for the years 1995–2003 are included to provide an historical context for the 2004 statistics. Much of the information in this review is presented in graphs and tables. Readers who prefer to view or manipulate tabular data may access the data set online at http://www.ntsb.gov/aviation/stats.htm.[2]

Part 121

Usually includes operators that fly large transport-category aircraft.

An operation is scheduled if an air carrier or operator offers in advance the departure location, departure time, and arrival location.[3]

Any scheduled or nonscheduled passenger-carrying operation. Regulations limit Part 121 operations to controlled airspace and controlled airports that have available specific weather, navigational, operational, and maintenance support.

Scheduled Part 135

A scheduled passenger-carrying operation that flies to smaller airports that do not provide the services required to support Part 121 operations.

Includes commercial air carriers flying smaller jet and turboprop aircraft commonly referred to as commuter airlines. The definition for scheduled operations in Part 121 also applies to Part 135.

On-Demand Part 135

Any operation for compensation or hire for which the departure location, departure time, and arrival location are negotiated with the customer.

Customers can arrange to charter an entire aircraft or book a single seat on an air taxi.[4]

Also includes medical evacuation flights when a patient is on board.

A total of 100 accidents occurred among U.S. air carriers in 2004, compared to 130 in 2003: 30 Part 121 accidents, 4 scheduled Part 135 accidents, and 66 on-demand Part 135 accidents (table 1). In 2004, air carriers flew more than 8 billion miles, recorded more than 11 million departures, and logged more than 22 million flight hours.

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1 Title 14 is also known as the *Federal Aviation Regulations* (FARs).

2 Appendix A contains a list of the 2004 air carrier accidents discussed in this review.

3 Title 14 CFR Part 119.3.

4 FARs restrict on-demand Part 135 operations to passenger-carrying operations conducted as a public charter; scheduled passenger-carrying operations of less than five round trips per week on at least one route between two or more points according to the published flight schedules; all-cargo operations conducted with airplanes having a payload capacity of 7,500 pounds or less; and all-cargo operations with rotorcraft.

Table 1. Accidents and Accident Rates for 2004

	Number of Accidents	Accidents Per Million Flight Hours
Part 121	30	1.59
Scheduled Part 135	4	13.2
On-Demand Part 135	66	20.4

As in foregoing years, Part 121 air carriers had the lowest accident rates of all commercial operations (tables 1 and 2) in 2004, while the accident rate for on-demand Part 135 air carriers was over 10 times greater than rates for Part 121 carriers. There were 25 fatal accidents in 2004: 2 in Part 121 operations and 23 in on-demand Part 135 operations.

Table 2. Fatal Accidents, Fatalities, and Fatal Accident Rates for 2004

	Number of Fatal Accidents	Fatalities	Fatal Accidents Per Million Flight Hours
Part 121	2	14	0.11
Scheduled Part 135	0	0	0.00
On-Demand Part 135	23	64	7.10

Activity Measures and Accident Rates

In 2004, the number of Part 121 accidents decreased by 44% from 2003, recording the lowest annual number of accidents in the 10-year period, and the number of on-demand Part 135 accidents decreased by 11% (figure 1). In contrast, scheduled Part 135 showed a slight increase, although there were few accidents in any one year.

Part 121 accidents decreased in spite of an increase in flight hours, which reached a 10-year peak in 2004 (figure 2). This increase in flight hours continues the pattern of increasing flight activity begun in 2003. Similarly, flight hours for on-demand Part 135 operations continued to increase in 2004, accounting for the reduction in the accident rate.

The increase in Part 121 accidents, hours, and departures beginning in 1997 can in part be explained by the reclassification of some scheduled Part 135 operations to Part 121 in March of that year.[5] As might be expected, the increase in Part 121 flight hours was also accompanied by an increase in departures (figure 3).

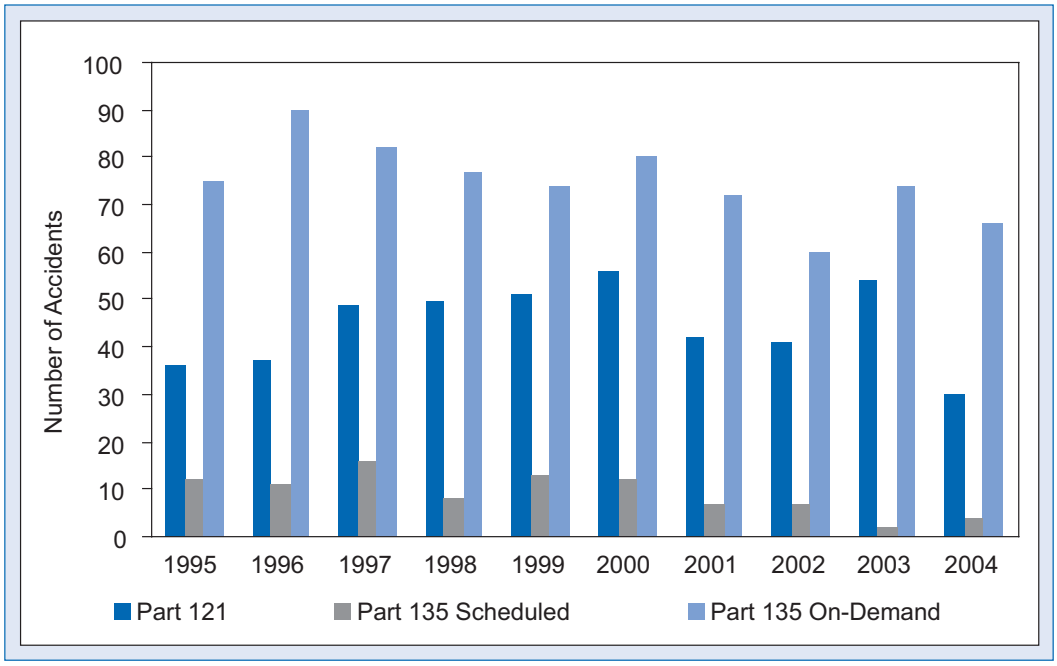

Figure 1. U.S. Carrier Accidents by FAR Part, 1995-2004

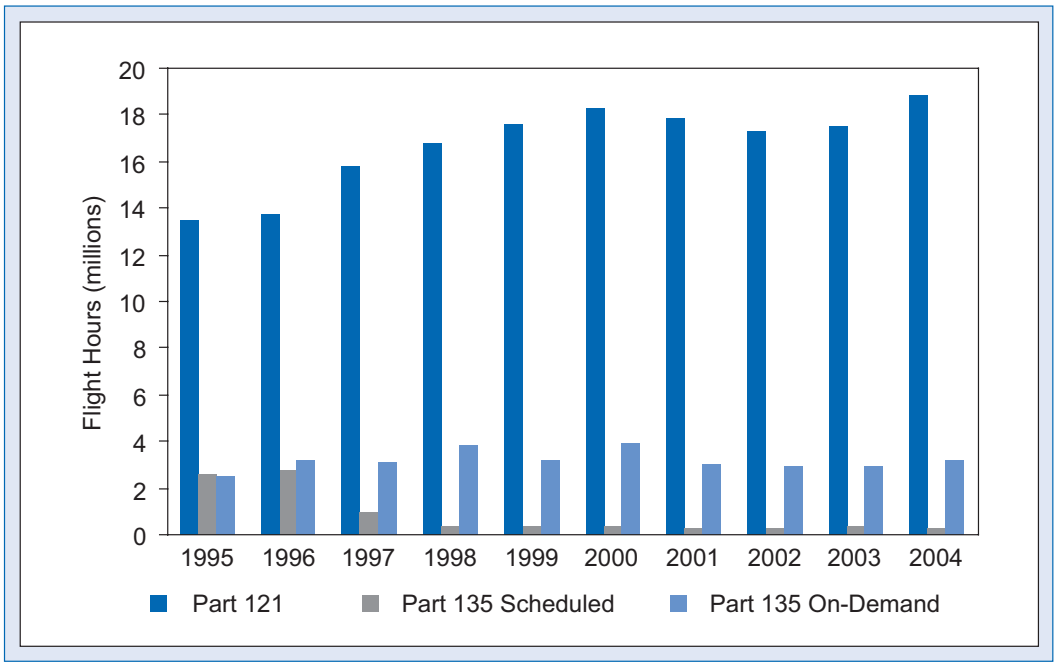

Figure 2. Flight Hours by FAR Part, 1995-2004

[5] The effect of this reclassification is discussed in more detail in appendix C.

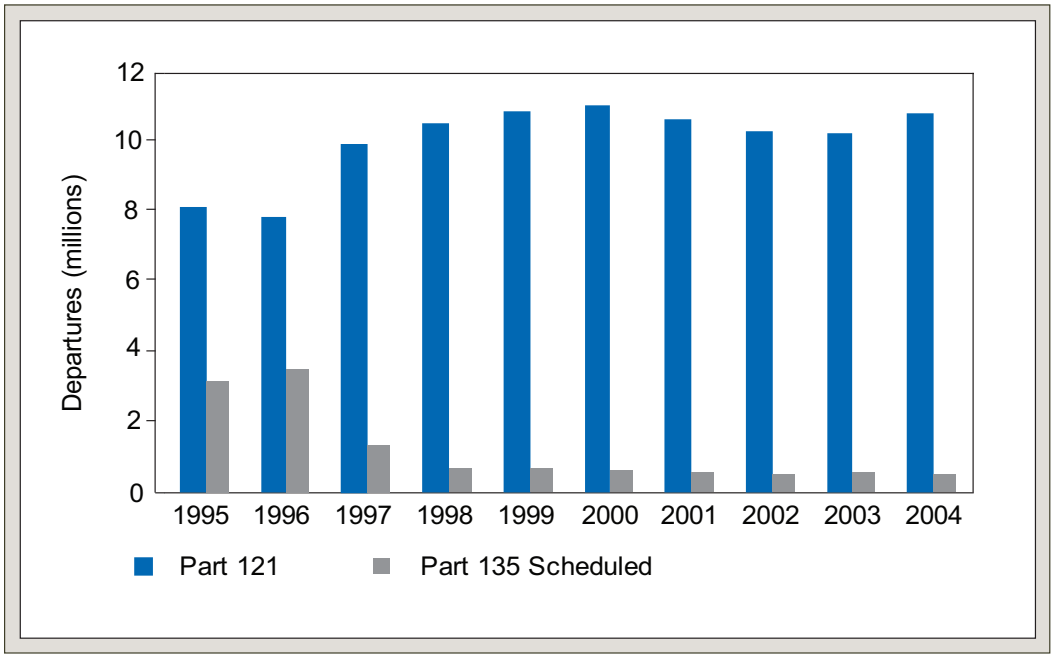

Figure 3. Scheduled Departures by FAR Part, 1995-2004

The flight activity data shown in figure 2 were compiled differently depending on the type of operation. Part 121 and scheduled Part 135 operations are required to report actual flight hours, and as a result, flight activity data for these operations are considered accurate. In contrast, on-demand Part 135 operations are not required to report flight activity data. Instead, these data are estimated using the voluntary *2004 General Aviation and Air Taxi Activity and Avionics* (*GAATAA*) *Survey*, which the Federal Aviation Administration (FAA) compiles annually from a sampling of owners of general aviation and on-demand Part 135 aircraft. Information gathered for the *GAATAA Survey* includes flight hours, avionics, base location, and use, but does not include miles flown or departures. Prior to 2004, the small proportion of on-demand Part 135 aircraft surveyed, combined with a sample based on aircraft owners rather than operators and low survey response rates, produced an imprecise activity estimate. Beginning with the 2004 *GAATAA Survey*, all turbine aircraft (turboprops and turbojets), all helicopters, all aircraft operating as on-demand Part 135, and all aircraft based in Alaska are surveyed. In addition, air medical service activity measures are separated into those flights operating under on-demand Part 135 and those operating under Part 91. These changes have substantially improved the estimates of activity collected.

Estimates of on-demand Part 135 aircraft activity are further complicated by the fact that, in 2002, the FAA changed its estimating method and revised its flight-hour estimates for on-demand Part 135 operations. The revised method calculates activity based on the number of aircraft assumed to operate in on-demand operations[6] and the average number of flight hours reported on the *GAATAA Survey*, and was applied retroactively to survey data for 1992–2001. As

[6] Data are derived from the FAA's Vital Information Subsystem, a database used to track commercial and government operations certificates.

a result, FAA's flight-hour estimates for on-demand Part 135 flight operations beginning in 1992 are substantially higher than they would have been using the previous method, and accident rates are, thus, consistently lower. This review uses the revised activity measures for on-demand Part 135 operations.[7]

Beginning with the reclassification of air carrier operations in 1997, scheduled Part 135 operations began to represent a smaller segment of air carrier operations than before. In 2004, scheduled 135 operations accounted for less than 1.5% of air carrier flight hours (figure 2) and less than 5% of scheduled air carrier departures (figure 3). Scheduled Part 135 operations also accounted for a small proportion of Part 135 accidents (figure 4). Consequently, the Part 135 discussion in this review focuses on on-demand (air taxi and charter) operations.

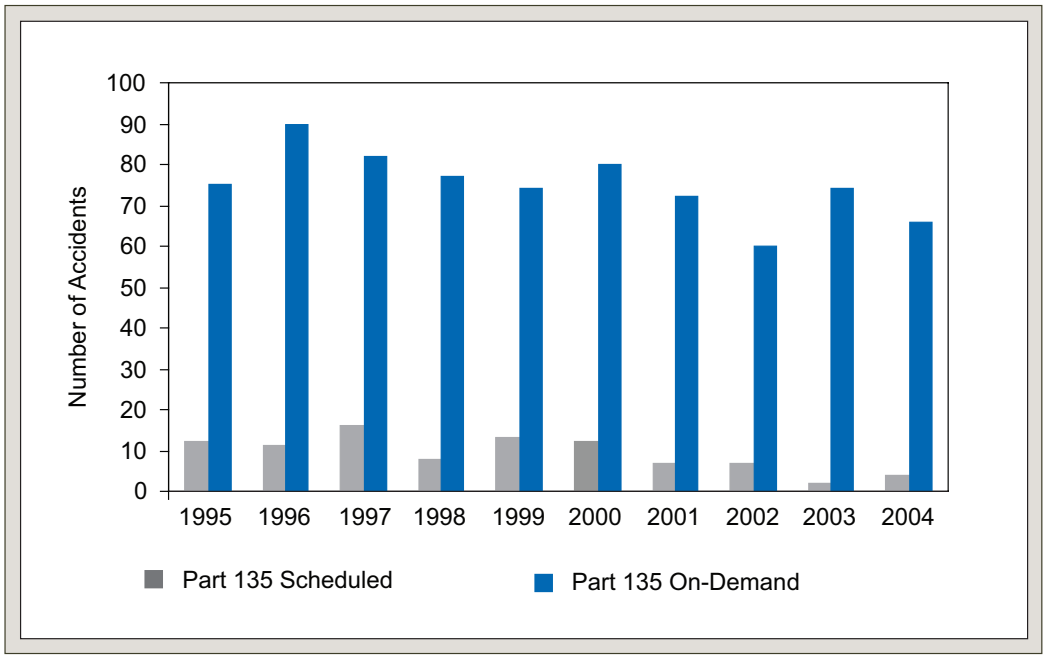

Figure 4. Part 135 Accidents by Type of Operation, 1995-2004

The number of Part 121 accidents varied over the 10-year period (figure 1), but the accident rate remained relatively constant (figure 5). On-demand Part 135 accident rates decreased overall from 1995–1998, rising slightly after 1998, and ranging between 20 and 25 accidents per million flight hours. Throughout the period, the accident rate for on-demand Part 135 operations (and for Part 135 operations in general) remained almost 10 times greater than the Part 121 rate, reflecting the variety of operating conditions and aircraft found in air taxi, air tour, and air medical operations.

[7] Appendix C discusses in more detail how on-demand Part 135 flight hours are estimated.

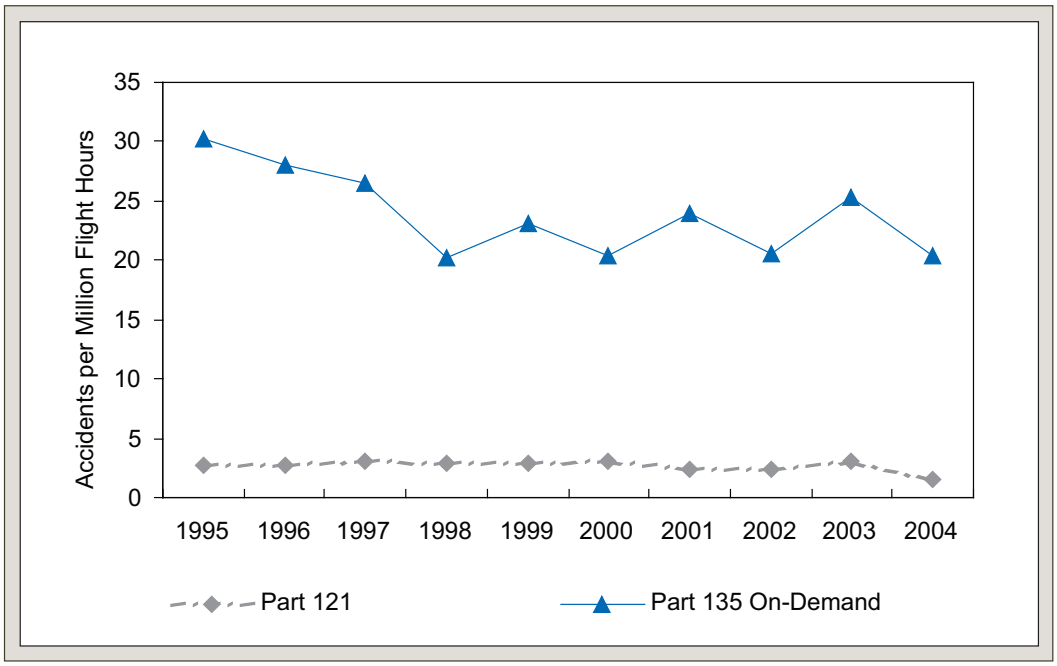

Figure 5. U.S. Carrier Accidents by FAR Part, 1995-2004

Fatal Accidents, 1995 through 2004

The number of fatal Part 121 accidents remained relatively constant and low from 1995 through 2004, but the number of on-demand Part 135 fatal accidents varied considerably from year to year (figure 6). The number of fatal accidents in 2004 was substantially higher than in 2003 despite the decrease in the total number of accidents. In fact, 2004 recorded the greatest number of on-demand Part 135 fatal accidents since 1996. In general, over the 10-year period, fatal Part 121 accidents accounted for the smallest number of air carrier accidents (less than 2%), whereas fatal on-demand Part 135 accidents accounted for the most (15%).

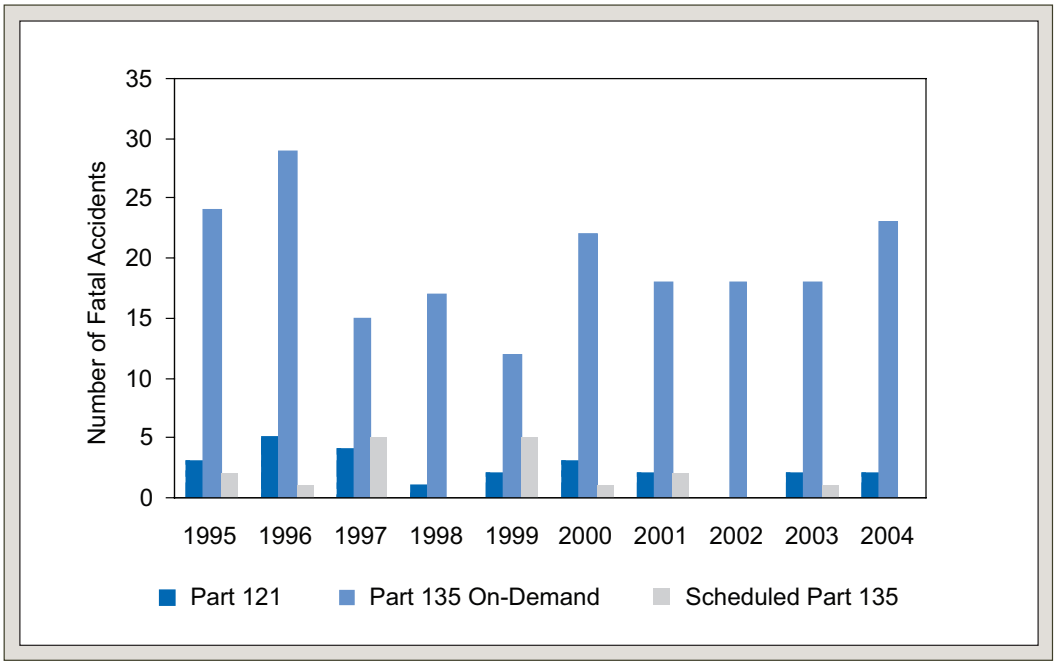

Figure 6. U.S. Air Carrier Fatal Accident by FAR Part, 1995-2004

PART 121 ACCIDENTS IN 2004

In 2004, Part 121 air carriers carried more than 655 million passengers a total of 7.9 billion miles and accumulated almost 19 million flight hours. The 30 Part 121 accidents involved 30 aircraft, producing an accident rate of 1.6 accidents per million flight hours and a fatal accident rate of .11 accidents per million flight hours. These accidents resulted in 14 fatalities, 20 serious injuries, and 23 minor injuries (table 3).[8]

Both the number of passengers injured in Part 121 accident flights (table 3) and the risk of injury remained low in 2004: only 1 of every 21.1 million passengers who boarded a Part 121 air carrier flight was injured in an accident, and only 1 of every 457,000 Part 121 passengers was involved in an accident. Of the 1,465 passengers involved in Part 121 accidents, only 2% received any type of injury. The number of flight and cabin crewmembers injured in Part 121 accidents was also small: only 9 of the 64 flight crew, and only 14 of the 54 cabin crew, were injured. Among the flight crew, 3 were fatally injured, 3 sustained serious injuries, and 3 received minor injuries. Among the cabin crew, 12 sustained serious injuries, and 2 received minor injuries.

Table 3. Part 121 Injuries by Role in 2004

	Fatal	Serious	Minor	None	Total
Flight crew	3	3	3	55	64
Cabin crew		12	2	40	54
Other crew				5	5
Passengers	11	3	17	1,434	1,465
Total aboard	14	18	22	1,534	1,588
Other aircraft				0	0
On ground		2	1		3
Total	14	20	23	1,534	1,591
Accidents	2	17	2	9	30

Five Part 121 accidents occurred outside of the United States and its territories. In addition, 7 of the 30 accidents were cargo-only flights.[9]

[8] Appendix A contains a list of the 2004 Part 121 accidents.

[9] Appendix A contains a list of the 2004 Part 121 accidents.

Accidents, Accident Severity, and Injuries

During 1995 – 2004, the number of Part 121 accidents reached its peak in 2000, and its lowest level in 2004 (table 4). Almost all of the accidents during that period (90%) were nonfatal injury-only or damage-only accidents. Accident rates based on flight hours (figure 7) show the same pattern and highlight how much greater the rates were for nonfatal injury-only and damage-only accidents than the more severe accidents. Over the decade the rates for major and serious accidents remained low.[10]

Table 4. Part 121 Accidents by Severity Classification, 1995-2004

Severity Classification	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Major	3	6	2	0	2	3	1	1	2	4
Serious	2	0	4	3	2	3	1	1	3	0
Nonfatal Injury-Only	14	18	24	21	20	20	19	14	24	15
Damage-Only	17	13	19	26	27	30	21	25	25	11
Total	36	37	49	50	51	56	42	41	54	30

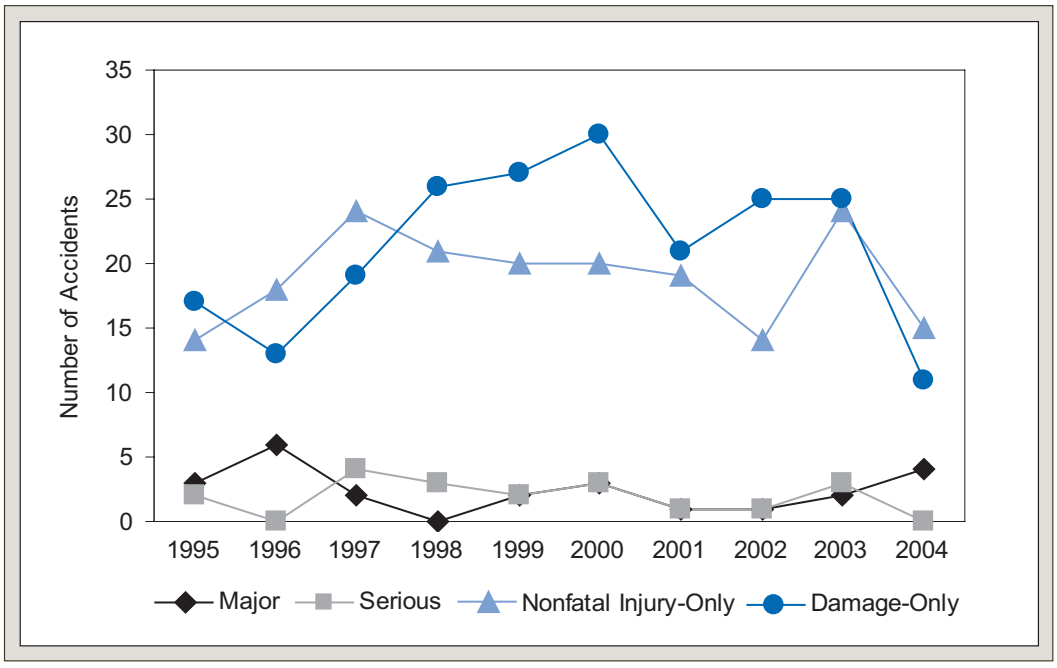

Figure 7. Part 121 Accidents by Severity Classification, 1995-2004

[10] The severity of a Part 121 accident is classified into one of four categories defined in appendix B. Briefly, an accident is major if there is at least one fatality and substantial damage to the aircraft, serious if there is at least one serious injury and substantial damage to the aircraft; injury-only if there are nonfatal injuries and no damage to the aircraft; and damage-only if there are no injuries but the aircraft is substantially damaged.

However, these data, especially injury data, can be dramatically affected by a few severe accidents in a given year. For instance, figure 8 shows that a large number of fatalities (963 total) occurred in 1995, 1996, and 2001; almost all of these fatalities (765) were attributed to just 4 of the 446 Part 121 accidents[11] that occurred in the decade 1995–2004. In general, however, the proportion of people injured in Part 121 accidents during the 10-year period was small.

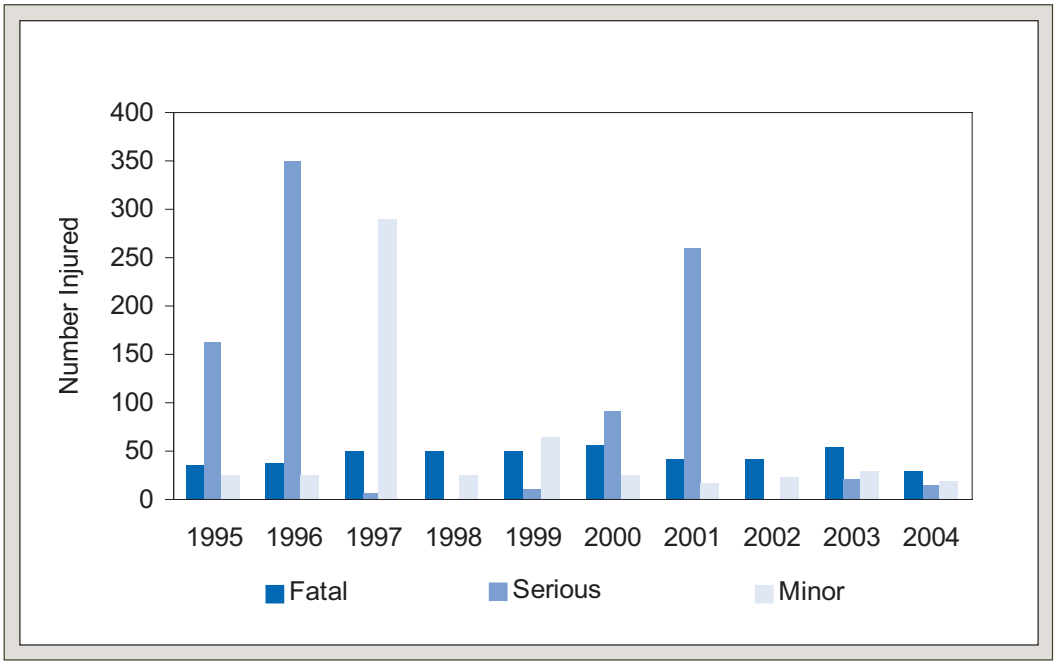

Figure 8. Number Injured by Level of Injury, Part 121 Accidents,1995-2004

In addition, the survivability of serious accidents over the 10 years remained quite high (tables 5, 6, 7, and 8); all of the accidents producing minor injuries and 95% of the accidents producing no injuries were associated with substantially damaged or destroyed aircraft. Table 4 shows that such low-injury accidents predominate the 10-year period.

In contrast, 15 serious-injury accidents in 2004 involved no damage to the aircraft (table 6). Most of those accidents (74%) were the result of encounters with turbulence, a topic discussed later in this review. On average, 93% of the accidents in 1995–2004 that produced serious injuries resulted in minor or no damage to the aircraft.

[11] American Airlines flight 965 on December 20, 1995, resulted in 160 fatalities; ValuJet flight 592 on May 11, 1996, resulted in 110 fatalities; TWA flight 800 on July 17, 1996, resulted in 230 fatalities; and American Airlines flight 587 on November 12, 2001, resulted in 265 fatalities.

Table 5. Part 121 Fatal Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed	3	4	1		1	2	1		1	2
Substantial		1								
Minor			1	1	1	1	1		1	
None			2							

Table 6. Part 121 Serious-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed								1		2
Substantial	2		1	2	1	2		1	2	
Minor		5	5	6	2	3		2	1	
None	14	13	19	15	18	17	19	12	23	15

Table 7. Part 121 Minor-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed		1	1		1	1			1	
Substantial	1	5	6	7		6	6	1	2	2
Minor										
None										

Table 8. Part 121 No-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed										
Substantial	15	8	13	19	27	23	15	23	23	9
Minor	2	2			1	1	2			
None						1		1		

Occurrences, Causes, and Factors

Investigators describe the events that take place during an accident as a sequence of occurrences, each identified with a phase of flight. The first occurrence associated with phase of flight describes the initiating event or starting point for an accident. Table 9 shows first occurrence data by phase of flight for Part 121 accidents in 2004. Appendix C discusses occurrences in more detail and how they are coded. First occurrence data for 26 of the 30 accidents that occurred in 2004 were available for this analysis.

In-flight encounters with weather during cruise or descent were the most frequently cited first occurrences for Part 121 operations and accounted for 31% of the Part 121 accidents in 2004. All in-flight encounters with weather during cruise and descent were attributed to turbulence.

The second most frequent first occurrences were ground operations, and approach and landing, each accounting for seven Part 121 accidents. Three of the on-ground collisions with an object occurred when ground vehicles collided with an airplane that was standing or pushing back. Two of the ground operations accidents occurred when a ramp employee was struck by a propeller, a rare event in Part 121 operations. Two of the approach and landing occurrences were associated with hard landings, and five with single occurrences of different types.

Table 9. Part 121 First Occurrences by Phase of Flight for 2004

	Cruise or Descent	Approach or Landing	Maneuver	Taxiing or Standing	Other	Total
In-Flight Encounter with Weather	8					8
On Ground Collision with Object				4		4
Miscellaneous			1	1	1	3
Altitude Deviation, Uncontrolled	2					2
Hard Landing		2				2
Propeller / Rotor Contact to Person				2		2
Dragged Wing, Rotor, Float or Tail / Skid		1				1
In-Flight Collision with Object		1				1
Loss of Engine Power (Total) Non-Mechanical		1				1
On Ground Encounter with Terrain / Water		1				1
Vortex Turbulence Encountered		1				1
Total Accident Airplanes	10	7	1	7	1	26

Table 10 relates the severity of an accident to phase of flight for the initiating event. Standing or taxiing accidents most often resulted in a damaged aircraft but few injuries, while cruise or descent were more often associated with non-fatal injury-only accidents (consistent with turbulence). Almost all of the accidents (88%) resulted in non-fatal injuries or airplane damage.

Table 10. Part 121 Accident Initiating Event, Severity Classification by Phase of Flight, 2004

	Cruise or Descent	Approach or Landing	Maneuver	Taxiing or Standing	Other	Total
Major		3				3
Serious						0
Injury	10	1	1	2	1	15
Damage		3		5		8
Total	10	7	1	7	1	26

Within each accident occurrence, any information that helps explain why that event happened is designated as either a "cause" or "factor." In addition, findings are cited to provide information of interest to the investigation. For most of the 10-year period, personnel were cited as a cause or factor in 70 to 80% of all Part 121 accidents, followed by environment-related causes, and then by aircraft-related causes. Calendar year 2003 was an exception, as shown in figure 9: personnel and the environment were cited almost equally in half the accidents, and aircraft factors were cited in only 16% of the accidents. Aircraft-related causes/factors hit a new low in 2004 for the 10-year period, and the number of accidents citing the environment increased overall.

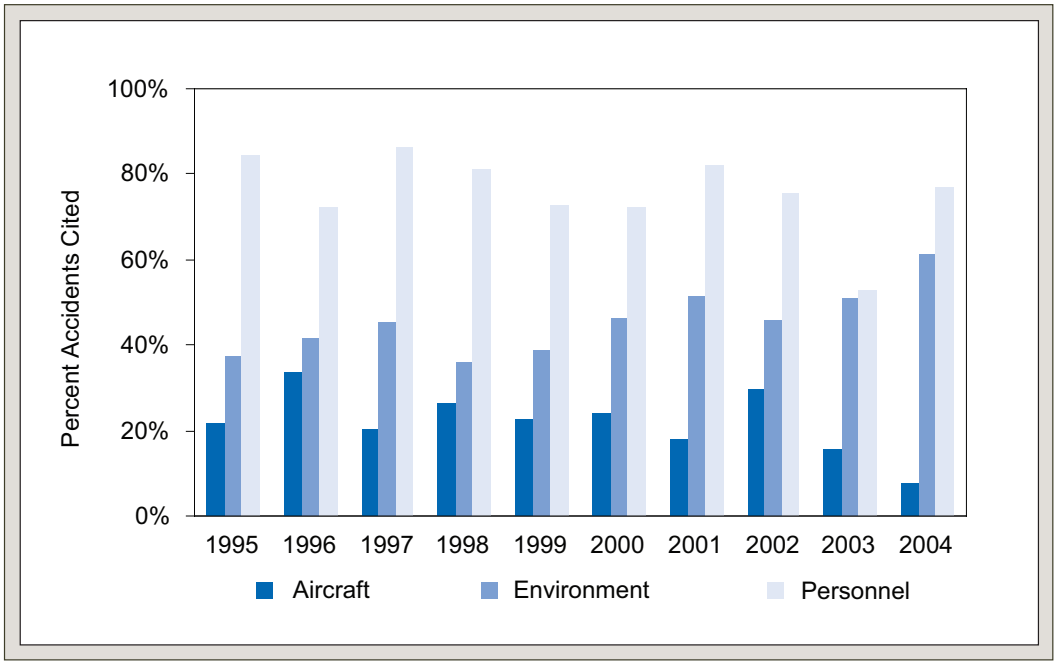

Figure 9. Broad Causes/Factors for Part 121 Accidents, 1995-2004

Figure 10 provides more detail about 2004 Part 121 accident causes and factors within the broad categories of personnel, aircraft, and environment. These data show the proportion of accidents where a specific cause or factor was cited at least once in the accident. Pilots were the most frequently cited cause or factor. However, others not on board accounted for a substantial proportion of the accidents (23%), reflecting the substantial number of accidents attributable to ramp personnel. After personnel, weather was the second most frequently cited cause or factor (38%). No specific aircraft component or equipment could be singled out as the leading cause or factor in aircraft-related accidents.

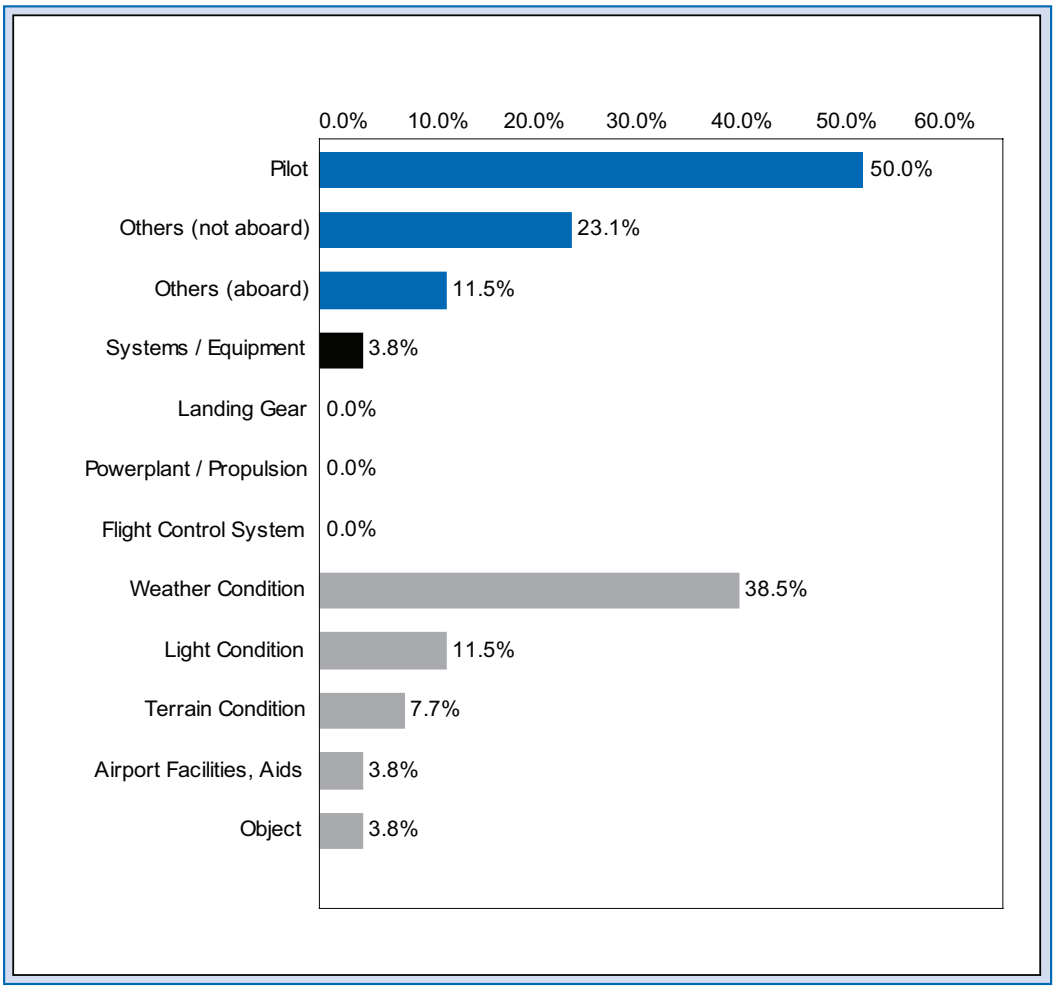

Figure 10. Top Causes/Factors in Part 121 Accidents for 2004

In 2004, turbulence was cited as a cause or factor in a third of all Part 121 accidents and accounted for almost 60% of all serious-injury accidents (table 11). Turbulence typically accounted for about 20% of all Part 121 accidents from 1995–2004 and was the leading cause or factor in all Part 121 accidents producing serious injuries. Table 12 shows that turbulence resulted in serious injuries, but caused no damage to the aircraft.

Table 11. Part 121 Turbulence Accidents by Highest Level of Injury, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fatal				1						
Serious	9	9	12	8	11	12	9	7	14	10
% Total Accidents	25.0%	24.3%	26.5%	16.0%	21.6%	21.4%	19.6%	17.1%	25.9%	33.3%
% Serious Injury Accidents	56.3%	50.0%	48.0%	34.8%	52.4%	54.5%	47.4%	43.8%	53.8%	58.8%

Table 12. Part 121 Turbulence Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Substantial				1						
Minor		2	2	1	2	2		1		
None	9	7	11	6	9	10	9	6	14	10

International Major Air Carrier Accidents

The Part 121 accidents that occurred in the United States accounted for half of all scheduled major air carrier accidents that occurred worldwide in 2004. According to the International Civil Aviation Organization (ICAO),[12] there were 55 reportable major air carrier accidents outside North America. A summary of the accidents by world region is shown in table 13.

[12] ICAO was established in 1944 by 52 member states to secure international cooperation in establishing uniformity in regulations and standards, procedures, and organization in civil aviation. One of ICAO's activities is to provide the aviation community with safety-related information, including accident and activity data. More about ICAO can be found at http://www.icao.int/.

Table 13. International Reportable Accidents by World Region in 2004

	Number of Accidents	Number of Fatal Accidents
United States & Canada	32	2
Central & South America	8	2
Europe & Russian Federation	17	3
Africa & Middle East	17	2
Asia & Pacific	13	2

The fact that the United States accounts for such a large proportion of the worldwide accident total is not surprising when air carrier activity is considered. Flight hours and departures as reported by ICAO for the top 10 countries in 2004 are shown in tables 14 and 15, respectively. The data show that Part 121 air carriers in the United States reported almost 8 times more flight hours and departures than the next most active countries in the rest of the world.

Table 14. 2004 Top 10 Most Active Countries Based on Flight Hours

	Domestic	International	Total
United States	14,103,860	2,810,083	16,913,943
China	1,976,863	368,726	2,345,589
United Kingdom	382,939	1,650,618	2,033,556
Germany	219,165	1,308,053	1,527,218
Japan	661,355	573,262	1,234,617
France	250,831	953,845	1,204,676
Spain	479,232	486,562	965,794
Canada	281,311	460,535	741,846
Russian Federation	337,995	262,343	600,338
Australia	259,901	300,773	560,674

Table 15. 2004 Top 10 Most Active Countries/Regions Based on Departures

	Domestic	International	Total
United States	8,739,914	812,487	9,552,401
China	1,113,861	87,610	1,201,471
United Kingdom	384,343	585,693	970,036
Germany	210,953	505,606	716,559
Japan	471,006	107,452	578,458
Spain	382,699	167,264	549,963
France	175,707	290,196	465,903
India	261,076	41,714	302,790
Mexico	208,127	66,530	274,657
Scandinavia	100,279	161,753	262,032

Accident rates provide a way to compare accident risk in different parts of the world. Tables 16 and 17 show the accident rates and fatal accident rates based on the number of fatal accidents, flight hours, and departures reported by ICAO. North America, Europe, and Asia produced the lowest fatal accident rates in 2003, while Central America and South America, and Africa and the Middle East produced the highest rates. In fact, the fatal accident rates for Africa and the Middle East were at least 8 times greater than the North American rates for both flight hours and departures.

Table 16. 2004 Accident Rates by World Region

	Accidents per Million Flight Hours	Accidents per Million Departures
United States & Canada	1.81	2.43
Central & South America	5.41	6.72
Europe & Russian Federation	1.67	3.41
Africa & Middle East	8.54	19.02
Asia & Pacific	1.71	3.94

Table 17. 2004 Fatal Accident Rates by World Region

	Fatal Accidents per Million Flight Hours	Fatal Accidents per Million Departures
United States & Canada	0.13	0.15
Central & South America	1.35	2.38
Europe & Russian Federation	0.29	0.60
Africa & Middle East	1.01	2.23
Asia & Pacific	0.26	0.61

PART 135 ACCIDENTS IN 2004

Part 135 applies to commercial air carriers that operate commuter flights (scheduled Part 135), charters and air taxis (on-demand Part 135), and cargo flights (which can be either scheduled or on-demand). There were 70 Part 135 accidents in 2004 (table 18). Of these, the 4 scheduled and 66 on-demand accidents produced accident rates of 13.2 and 20.4 accidents per million flight hours, respectively. Part 135 accidents resulted in 63 fatalities, 17 serious injuries, and 12 minor injuries (table 19), all occurring in on-demand operations. The 5 on-demand Part 135 accidents listed below accounted for 33 of the 63 fatalities, and details about these accidents can be found in Appendix A:

- On March 23, 2004, an Era Aviation, Inc., Sikorsky S-76A helicopter was destroyed when it crashed into the Gulf of Mexico about 70 nautical miles south-southeast of Scholes International Airport, Galveston, Texas. The helicopter was transporting oil service personnel to the Transocean, Inc., drilling ship *Discoverer Spirit*. The captain, first officer, and eight passengers were fatally injured.
- On July 2, 2004, a U.S.-registered Westwind corporate jet, operated by Air Trek, Inc., as an air ambulance flight, impacted terrain and crashed into a building after departing from the Tocumen International Airport, Panama. All six occupants on the airplane were fatally injured. A seventh person was also fatally injured on the ground.
- On August 21, 2004, a Bell 407 helicopter operating as an air ambulance flight was destroyed when it impacted mountainous terrain in cruise flight about 27 nautical miles southwest of Battle Mountain, Nevada. The pilot, the two medical crewmembers, the infant patient, and the infant's mother, were fatally injured.
- On September 20, 2004, an amphibious float-equipped de Havilland DHC-2 airplane, departed the Sitka Rocky Gutierrez Airport, Sitka, Alaska, for a remote lodge located near the Warm Springs Bay Seaplane Base, Baranof, Alaska. The airplane did not arrive at the lodge, and was reported overdue. The airplane is missing, and the pilot and the 4 passengers are presumed to have received fatal injuries.
- On November 27, 2004, a U.S.-registered Construcciones Aeronauticas Sociedad Anonima C-212-CC twin-engine, turboprop airplane, operated by Presidential Airways, Inc., of Melbourne, Florida, for the U.S. Department of Defense, collided with mountainous terrain near Bamiyan, Afghanistan, and was destroyed. The captain, the first officer, a U.S. civilian passenger, and three military passengers were fatally injured.

Table 18. Part 135 Accidents, Highest Injury by Type of Operation in 2004

	Scheduled	On-Demand	Total
Fatal	0	23	23
Serious	0	6	6
Minor	0	5	5
None	4	32	36
Total	4	66	70

Table 19. Part 135 Occupant Injuries, Injury Severity by Type of Operation in 2004

	Scheduled	On-Demand	Total
Fatal	0	63	63
Serious	0	17	17
Minor	0	12	12
None	21	132	153
Total	21	224	245

Although on-demand accidents accounted for most Part 135 accidents and injuries, the accident rates for both types of Part 135 operations demonstrated considerable variability during the period from 1995 through 2004 (figure 11). The on-demand Part 135 accident rate fluctuated between 20 and 25 accidents per 100,000 flight hours. The small number of scheduled Part 135 accidents resulted in large changes in the accident rate during the same period, rising considerably above the on-demand rate after the Part 121/Part 135 reclassification in 1997, and peaking in 1999 before falling to a near record low in 2003. Note that the on-demand Part 135 accident rate was at its highest in 1995 and steadily declined until 1998.

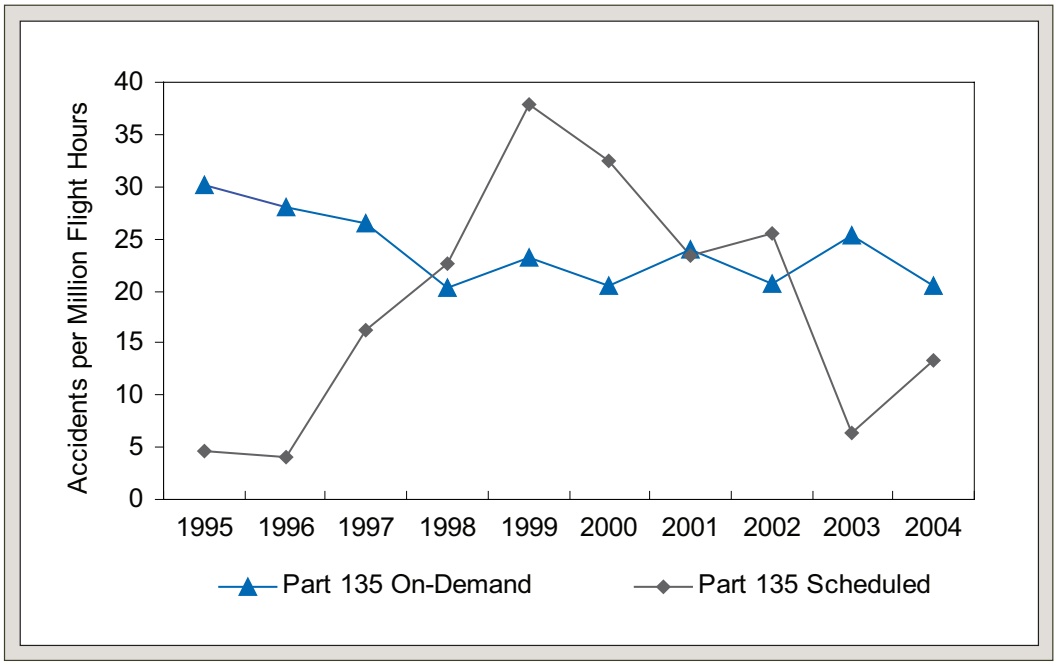

Figure 11. Part 135 Accident Rates, 1995-2004

As previously mentioned, the FAA uses the *GAATAA Survey* to estimate on-demand Part 135 flight hours. The 2004 estimates of flight hours and fleet size for on-demand part 135 airplanes and helicopters is shown in table 20. In 2004, airplanes accounted for 77% of the fleet, and helicopters accounted for about 22%.

Table 20. 2004 On-Demand Part 135 Flight Hours and Fleet Size

	On-Demand Active Fleet Size	GAATAA Survey Flight Hour Estimates
Airplane	5,890	2,455,585
Helicopter	1,657	766,090
Overall[a]	7,606	3,237,771

[a] In addition to airplanes and helicopters, the GAATAA Survey estimate of the On-Demand Part 135 fleet includes 3 lighter-than-air and 56 experimental aircraft.

On-Demand Part 135 Accidents

On-demand Part 135 accident rates for airplanes and helicopters in 2004, based on the FAA estimate of flight hours, are shown in table 21. Helicopters accounted for 30% of the on-demand Part 135 accidents and produced accident and fatal accident rates greater than those for airplanes. The proportion of on-demand Part 135 accidents involving helicopters steadily increased after 1997, to a high of 20 in 2004 (table 22).

Table 21. On-Demand Part 135 Accidents, Fatal Accidents, and Accident Rates for 2004

	Accidents	Fatal Accidents	Flight Hours	Accidents per Million Flight Hours	Fatal Accidents per Million Flight Hours
Airplane	46	15	2,455,585	18.7	6.1
Helicopter	20	8	766,090	26.1	10.4
Overall	66	23	3,237,771	20.4	7.1

Table 22. On-Demand Part 135 Accidents, Airplanes and Helicopters, 1995- 2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Airplane	66	80	73	66	59	63	54	43	47	46
Helicopter	10	11	10	11	15	17	18	17	27	20
% Helicopter	13%	12%	12%	14%	20%	21%	25%	28%	36%	30%

On-Demand Part 135 Accident Severity and Injuries

Data for 2004 demonstrate that the potential for injury in on-demand Part 135 accidents is much greater than in Part 121 accidents. More than half of the Part 135 accidents in 2004 resulted in injuries and more than a third of the accidents were fatal (table 18). Although less than 3% of the people on board Part 121 accident aircraft suffered any injury, 41% of the people on board on-demand Part 135 accident aircraft were injured (54% of the crew and 33% of the passengers), and 68% of the injuries were fatal (table 23). The pattern of injuries in 2004 was consistent with previous years with the most fatalities in the 10-year period occurring in 2000 and the least in 2002, as shown in figure 12. Although a few accidents can substantially increase the number of injuries in one year, the relatively small number of passengers carried by on-demand Part 135 aircraft limits the number of people that can be injured in a single accident.[13]

[13] On-demand Part 135 operators are limited to aircraft with a maximum seating capacity (not including the crew) of 9 passengers in piston-engine airplanes, 30 passengers in turbo-prop or jet airplanes, and 12 passengers in helicopters.

Table 23. On-Demand Part 135 Accident Injuries by Role for 2004

	Fatal	Serious	Minor	None	Total
Flight crew	23	8	6	36	73
Cabin crew	1	0	0	0	1
Other crew	6	3	0	4	13
Passengers	33	6	6	92	137
Total aboard	63	17	12	132	224
On ground	1	0	0	0	1
Other aircraft					0
Total	64	17	12	132	225
Accidents	23	6	5	32	66

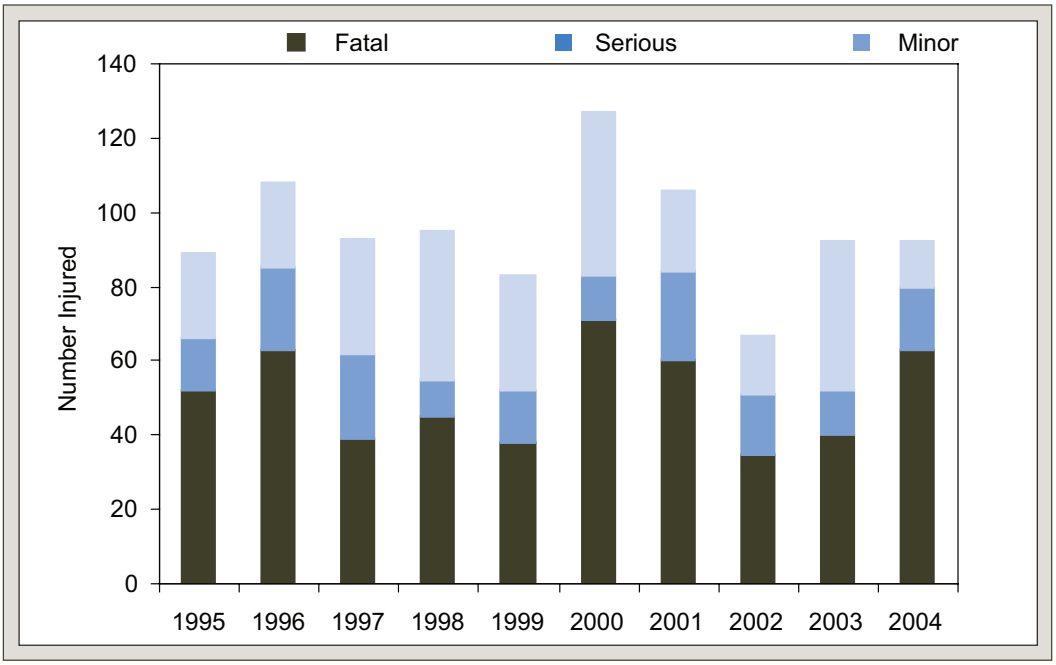

Figure 12. On-Demand Part 135 Accidents, Number Injured by Level of Injury, 1995-2004

As expected, the potential for fatal or serious injury increases with the level of aircraft damage. In 2004, 20 of the 23 fatal on-demand Part 135 accidents involved aircraft that were destroyed (table 24), and all 6 of the serious-injury accidents were associated with aircraft that were either destroyed or substantially damaged (table 25). This pattern was consistent from 1995 through 2004: 84% of the fatal accidents were associated with aircraft that were destroyed and 90% of the serious-injury accidents involved aircraft that were substantially damaged or destroyed. However, the survivability of on-demand Part 135 accidents can be quite good: all but one of the minor-injury accidents and 98%[14] of the no-injury accidents from 1995–2004 involved aircraft that were substantially damaged or destroyed (tables 26 and 27).

Table 24. On-Demand Part 135 Fatal Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed	19	28	14	15	11	19	15	13	11	20
Substantial	5	1	1	2	1	3	2	5	5	3
Minor									2	
None							1			

Table 25. On-Demand Part 135 Serious-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed		7	3		2	2	1	2	2	2
Substantial	5	2	9	3	6	3	7	3	1	4
Minor					1					
None		2	2		1		1			

[14] The 6 minor-damage accidents shown in table 27 were the result of collisions with other aircraft that caused at least substantial damage, or serious or fatal injuries.

Table 26. On-Demand Part 135 Minor-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed	1	1	5	4		2	1		5	1
Substantial	6	9	9	12	11	12	6	5	12	12
Minor										
None		1								

Table 27. On-Demand Part 135 No-Injury Accidents for Each Level of Damage, 1995-2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Destroyed	1	1	1				2	3		2
Substantial	38	39	38	41	41	38	36	29	36	30
Minor	1		1		1	1		2		
None								1		

When airplanes were compared to helicopters, a different pattern emerged. In 2004, a person in an airplane was somewhat more likely to be injured than a person in a helicopter: 63% of the people in airplanes suffered some form of injury in an accident compared with 52% people in helicopters (table 28). Although more people were fatally injured in airplanes than in helicopters in 2004, fatalities represented a greater proportion of the injuries in helicopters (63%).

Table 28. On-Demand Part 135 Accident Injuries by Type of Aircraft in 2004

	Airplane	Helicopter	Total
Fatal	35	29	64
Serious	11	6	17
Minor	5	7	12
Total Injuries	86	46	132
Total Onboard	137	88	225

Occurrences, Causes, and Factors

The factors underlying on-demand Part 135 accidents are characterized in the data in the same way as for Part 121 accidents: as a sequence of occurrences, each identified with a phase of flight, that describe the events that took place during the accident. Investigators also indicate the causes and factors associated with occurrences. The first occurrence associated with phase of flight describes the initiating event for an accident flight. Appendix C discusses occurrence data and how they are coded by Safety Board investigators.

Table 29 shows first occurrence data by phase of flight for airplanes involved in on-demand Part 135 accidents. Approach or landing accounted for 47% of the airplane accidents and, as shown in table 30, 33% of the fatal and serious airplane accidents in 2004. This pattern was consistent with Part 121 accidents with one notable exception: although most of the injury-producing accidents in Part 121 operations occurred in flight and were typically associated with turbulence, turbulence was rarely cited as a cause or factor in on-demand Part 135 accidents. Loss of control and in-flight encounters with weather were the most frequent initiating events in on-demand Part 135 airplane accidents in 2004, a combination that accounted for more than a third of the accidents.

Table 29. On-Demand Part 135 Airplanes, First Occurrences by Phase of Flight in 2004

	Takeoff or Climb	Cruise or Descent	Approach or Landing	Maneuver	Standing Taxiing Other	Total
In-flight Encounter with Weather		4	2	1		7
Loss of Control - In-flight	3	1	3			7
In-flight Collision with Object			5			5
Airframe, Component, System Failure	1	1	1			3
On Ground / Water Collision with Object	1		1		1	3
In-flight Collision with Terrain or Water		1	1			2
Loss of Engine Power	2					2
On Ground Encounter with Terrain/Water			2			2
Overrun	1		1			2
Hard Landing			1			1
Loss of Engine Power (Total) Mechanical		1				1
Miscellaneous	1					1
Missing Aircraft					1	1
On Surface Encounter with Weather	1					1
Undershoot			1			1
Wheels Up Landing			1			1
Total	10	8	19	1	1	40

Table 30. 2004 On-Demand Part 135 Airplane Accidents by Severity and Phase of Flight

	Takeoff or Climb	Cruise or Descent	Approach or Landing	Maneuver	Taxiing Standing	Other	Total
Fatal	2	4	4			1	11
Serious	1	2	1	1			5
Minor		1	1				2
None	7	1	13		1		22
Total	10	8	19	1	1	1	40

In 2004, most of the initiating events for on-demand Part 135 helicopter accidents involved in-flight encounters with weather or by loss of engine power (table 31). Most accidents occurred during cruise or decent, and most of the fatal on-demand Part 135 helicopter accidents occurred during that phase of flight (table 32). Only 8 of the 20 helicopter accidents were fatal, and more than half resulted in either minor injuries or no injuries.

Table 31. On-Demand Part 135 Helicopters, First Occurrences by Phase of Flight for 2004

	Takeoff or Climb	Cruise or Descent	Approach or Landing	Maneuver or Hover	Standing	Total
In-Flight Encounter with Weather	1	4		1		6
Loss of Engine Power	1	2	1			4
In-Flight Collision with Object		1	1	1		3
In-Flight Collision with Terrain or Water		2				2
Hard Landing	1					1
Loss of Control In-Flight	1					1
Loss of Engine Power (Partial) - Mechanical				1		1
Loss of Engine Power (Total) - Nonmechanical		1				1
Miscellaneous/Other					1	1
Total	4	10	2	3	1	20

Table 32. 2004 On-Demand Part 135 Helicopter Accidents by Severity and Phase of Flight

	Takeoff or Climb	Cruise or Descent	Approach or Landing	Maneuver Hover	Taxiing Standing	Total
Fatal	1	5		2		8
Serious		1				1
Minor	1	2				3
None	2	2	2	1	1	8
Total	4	10	2	3	1	20

In 2004, pilots of on-demand Part 135 accident aircraft were the most frequently cited cause or factor, as shown in table 33, followed by the environment, which was cited in more than half of both airplane and helicopter accidents. Weather was cited in more than 25% of all airplane accidents and 40% of all helicopter accidents. Although aircraft-related causes or factors were cited about equally for airplane and helicopter accidents, powerplants accounted for proportionally more causes or factors in helicopter accidents than in airplane accidents, and structures were cited more frequently for airplanes than helicopters. Because multiple factors in an accident are coded only once at the level of personnel, aircraft, or environment, the sum of the individual percentages may be greater than the broad cause/factor percentage.

Table 33. On-Demand Part 135 Accidents, Top Causes/Factors in 2004

	Percent Airplane Accidents	Percent Helicopter Accidents
Personnel	97.6%	100.0%
Pilot	92.7%	90.0%
Others (aboard)		
Others (not aboard)	12.2%	20.0%
Aircraft	24.4%	20.0%
Powerplant/propulsion	2.4%	5.0%
Flight control systems		
Aircraft structure	9.8%	5.0%
Landing gear	7.3%	
Systems and equipment	4.9%	10.0%
Environment	51.2%	55.0%
Weather condition	26.8%	40.0%
Terrain condition	12.2%	15.0%
Light condition	9.8%	30.0%
Object	9.8%	15.0%

The pattern of causes and factors for on-demand Part 135 accidents in 2004 was consistent with previous years, as shown in tables 34 and 35, although the proportions varied considerably from year to year. Pilots were the most frequently cited cause/factor for on-demand Part 135 accidents, followed by the environment. For both airplanes and helicopters, weather and terrain led the environmental category. Until 2004, the powerplant was consistently the most frequently cited aircraft-related cause or factor for helicopters. In 2004, the powerplant, systems and equipment, and landing gear were cited in almost equal numbers for airplane accidents. Note that airport facilities and navigation aids were rarely cited as a cause or factor in helicopter accidents. These patterns are consistent with Part 121 data; however, aircraft-related causes/factors were cited less frequently in on-demand Part 135 accidents than in Part 121 accidents, and the recent increase in environment-related causes and factors in Part 121 accidents was only evident in 2004 on-demand Part 135 helicopter accidents.

Table 34. On-Demand Part 135 Airplane Accidents, Top Causes/Factors, 2000-2004

	2000	2001	2002	2003	2004
Personnel					
Pilot	80.0%	84.3%	80.5%	80.0%	92.7%
Others (aboard)					
Others (not aboard)	23.3%	15.7%	24.4%	15.6%	12.2%
Aircraft					
Powerplant/propulsion	18.3%	11.8%	4.9%	6.7%	2.4%
Flight control systems		2.0%		2.2%	
Aircraft structure	3.3%	7.8%		4.4%	9.8%
Landing gear	5.0%	9.8%	7.3%	8.9%	7.3%
Systems and equipment	8.3%	2.0%	2.4%	4.4%	4.9%
Environment					
Weather condition	36.7%	39.2%	31.7%	26.7%	26.8%
Terrain condition	31.7%	19.6%	19.5%	28.9%	12.2%
Light condition	15.0%	15.7%	14.6%	15.6%	9.8%
Object	8.3%	11.8%	4.9%	6.7%	9.8%
Airport/airways facilities, aids	11.7%	3.9%	4.9%		2.4%

Table 35. On-Demand Part 135 Helicopter Accidents, Top Causes/Factors, 2000-2004

	2000	2001	2002	2003	2004
Personnel					
Pilot	70.6%	55.6%	100.0%	86.4%	90.0%
Others (aboard)		5.6%		4.5%	
Others (not aboard)	17.6%	16.7%	13.3%	4.5%	20.0%
Aircraft					
Powerplant/propulsion	35.3%	22.2%	13.3%	22.7%	5.0%
Flight control systems		5.6%			
Aircraft structure		5.6%		4.5%	5.0%
Landing gear		5.6%			
Systems and equipment		5.6%	6.7%	13.6%	10.0%
Environment					
Weather condition	35.3%	22.2%	26.7%	27.3%	40.0%
Terrain condition	29.4%	38.9%	26.7%	18.2%	15.0%
Light condition	17.6%	5.6%	20.0%	4.5%	30.0%
Object	17.6%		13.3%	9.1%	15.0%
Airport/airways facilities, aids					5.0%

Scheduled Part 135 Accidents

Scheduled Part 135 operations represent a small segment of scheduled air carrier operations, accounting for less than 1.5% of total air carrier flight hours in 2004. Four accidents occurred in 2004, all in Alaska and resulting in no injuries.[15]

- On February 10, 2004, a Cessna 208B airplane sustained substantial damage when it collided with snow-covered terrain after it departed the runway and nosed over during the takeoff roll at the Toksook Bay Airport, Alaska. The airplane was operated as flight 2821 by Grant Aviation, Inc., Anchorage, Alaska. The pilot and 6 passengers were not injured.
- On April 4, 2004, an amphibious Grumman G21 airplane sustained substantial damage when the left main landing gear collapsed following a loss of control while landing at the Unalaska Airport, Alaska. The two pilots and seven passengers were not injured. The airplane was being operated as flight 325 by Peninsula Airways, Anchorage, Alaska, doing business as PenAir.
- On September 17, 2004, a Piper PA-31-350 airplane sustained substantial damage when it landed on a gravel-surfaced runway with the landing gear retracted at the Minchumina Airport, located about 40 miles north-northeast of Telida, Alaska. The airplane was being operated as flight 147 by Everts Air Alaska, Fairbanks, Alaska. The pilot and sole passenger were not injured.
- On October 11, 2004, a Cessna 207 airplane operated by Hageland Aviation Services as flight 63 sustained substantial damage when it struck a bird while on final approach to land at the Chefornak Airport, Alaska. The pilot and two passengers were not injured.

Because both the number of scheduled Part 135 accidents and the number of people involved in those accidents is small each year, accident and injury data vary over the years (figure 13). Although the relatively few scheduled Part 135 accidents every year make stable patterns in the data difficult to discern, the number of scheduled Part 135 accidents and injuries declined overall from 1995 through 2004.

Three of the accidents occurred during approach and landing, and the fourth occurred during takeoff and climb. In all the accidents except the bird strike, the flight crew was cited in the probable cause in terms of planning and decision-making, supervision, or failing to execute a procedure.

[15] Over half of all scheduled Part 135 operators were certificated in Alaska in 2004, which may account for the preponderance of accidents in that state. See *Aviation Safety in Alaska*, Safety Study NTSB/SS-95-03 (Washington, DC: National Transportation Safety Board, 1995).

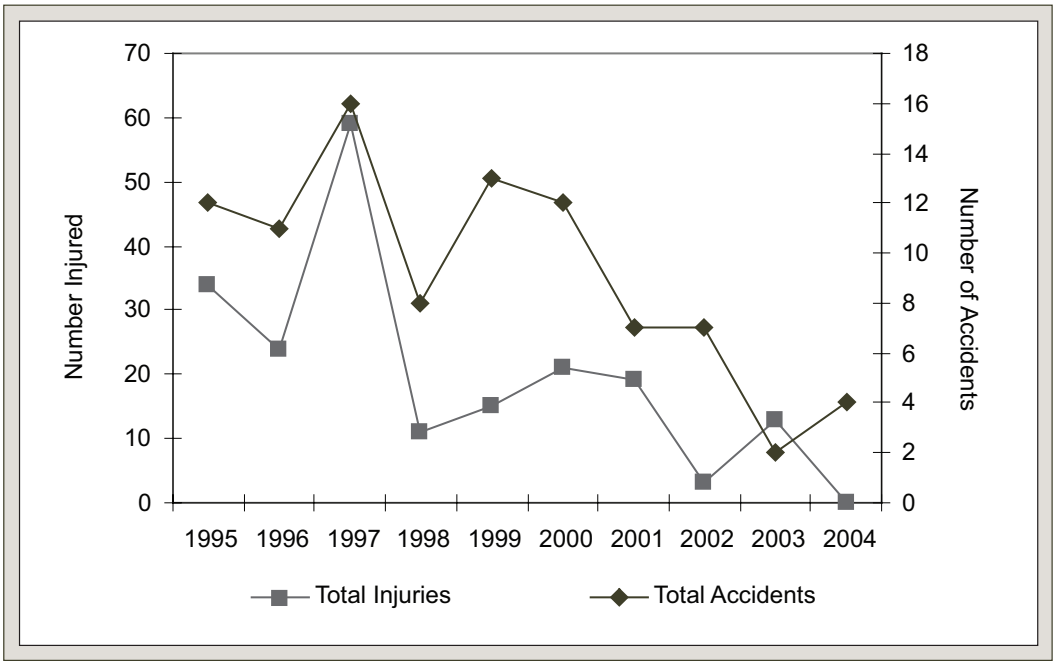

Figure 13. Scheduled Part 135 Accidents and Number People Injured, 1995-2004

Appendix A: 2004 Air Carrier Accident Data

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Aircraft Type	Damage to Aircraft	Highest Injury	Accident Severity	Total Fatalities	First Occurrence	Phase of Flight
February 1, 2004	N158SD	Passenger and Cargo	Pittsburgh, PA	Shuttle America, DBA US Airwarys Express	Saab-Scania AB (Saab) 340A	Substantial	None	Damage	0	Miscellaneous/Other	Standing
Probable Cause: The failure of the baggage cart E-hitch pin, which resulted in the baggage cart separating from its tug, and subsequently impacting a parked airplane.											
February 24, 2004	N420XJ	Passenger	Romulus, MI	Mesaba Aviation	Saab-Scania AB (Saab) Saab 340B	Substantial	None	Damage	0	On Ground/Water Collision with Object	Taxi - Pushback/Tow
Probable Cause: The visual lookout not maintained and the procedures not followed by the Push Tug Operator during the pushback. Factors were the parked airplane, the dark night, and the inadequate surveillance of the pushback by airline management.											
March 1, 2004	N516UA	Passenger	Janesville, WI	United Airlines	Boeing 757-200	None	Serious	Injury	0	Altitude Deviation,Uncontrolled	Descent - Normal
Probable Cause: The unexpected encounter with convective turbulence.											
March 15, 2004	N155ZV	Passenger	Manhattan, KS	Air Midwest Airlines, DBA US Airways Express	Beech 1900D	Substantial	None	Damage	0	On Ground/Water Encounter with Terrain/Water	Landing - Roll
Probable Cause: The captain's improper decision due to his attempt to taxi back onto the runway after coming to a stop in the grass, and the resulting collapse of nose landing gear. Contributing factors were the inoperative nose wheel steering, the pilot's inability to maintain directional control during the landing roll due to the crosswind, and the high crosswind component. Additional factors were the uneven transition between the grass and the runway pavement, as well as the soft grass.											
April 1, 2004	N149CJ	Passenger	Windsor Locks, CT	Colgan Air, DBA US Airways Express	Beech 1900D	Substantial	None	Damage	0	On Ground/Water Collision with Object	Taxi - From Landing
Probable Cause: The fuel truck driver's failure to maintain clearance with a taxiing airplane, resulting in the collision between the fuel truck and the airplane. A factor in the accident was the night condition.											
April 10, 2004	N662SW	Passenger	St. Louis, MO	Southwest Airlines	Boeing 737-300	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise
Probable Cause: The inadvertent encounter with turbulence which resulted in the injury to the flight attendant.											
April 14, 2004	N448WN	Passenger	Beach Haven, NJ	Southwest Airlines	Boeing 737-700	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise
Probable Cause: An encounter with turbulence during cruise flight.											
April 27, 2004	N715FE	Cargo	Melo, Uruguay	Federal Express	Fokker F27-500	Substantial	None	Damage	0		
Probable Cause:											
April 28, 2004	N189AX	Cargo	Bogota, Colombia	Challenge Air Cargo	Boeing DC-10-30	Substantial		Damage	0		
Probable Cause:											
May 9, 2004	N438AT	Passenger	San Juan, PR	Executive Airlines, DBA American Eagle	ATR 72	Destroyed	Serious	Major	0	Hard Landing	Landing
Probable Cause: The captain's failure to execute proper techniques to recover from the bounced landings and his subsequent failure to execute a go-around.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Aircraft Type	Damage to Aircraft	Highest Injury	Accident Severity	Total Fatalities	First Occurrence	Phase of Flight
May 26, 2004	N573AA	Passenger	Near St. Louis, MO	American Airlines	McDonnell Douglas DC-9-82 (MD-82)	None	Serious	Injury	0	Altitude Deviation,Uncontrolled	Descent
Probable Cause: The unexpected encounter with convective turbulence which resulted in a flight attendant being injured.											
June 4, 2004	N757LV	Passenger	Liberal, KS	Southwest Airlines	Boeing 737-7H4	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise
Probable Cause: The adverse weather encountered during cruise flight by the flight crew and the flight attendant not being restrained. A contributing factor was the convective activity.											
July 15, 2004	N585AA	Passenger	Sheridan, IL	American Airlines	McDonnell Douglas DC-9-82	None	Serious	Injury	0	In-flight Encounter with Weather	Descent
Probable Cause: The convection induced turbulence and the flight attendant not being restrained.											
July 17, 2004	N812AW	Passenger	Flat Rock, VA	America West Airlines	Airbus Industrie A319	None	Serious	Injury	0	In-flight Encounter with Weather	Descent - Normal
Probable Cause: An inadvertent encounter with turbulence in clouds during descent.											
July 21, 2004	N995CA	Passenger	Snow Hill, VA	Comair	Bombardier CL-600	None	Serious	Injury	0	Miscellaneous/Other	Maneuvering
Probable Cause: The pilot's excessive maneuvering in response to a TCAS alert, which resulted in a serious injury to the flight attendant.											
July 25, 2004	N797AN	Passenger	Miami, FL	American Airlines	Boeing 777	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise
Probable Cause: The in-flight encounter with unforecasted clear air turbulence.											
August 13, 2004	N586P	Cargo	Florence, KY	Air Tahoma	Convair Div. of Gen. Dynamics CV-340 (580)	Destroyed	Fatal	Major	1	Loss of Engine Power(Total) - Nonmechanical	Approach
Probable Cause: Fuel starvation resulting from the captain's decision not to follow approved fuel crossfeed procedures. Contributing to the accident were the captain's inadequate preflight planning, his subsequent distraction during the flight, and his lateinitiation of the in-range checklist. Further contributing to the accident was the flight crew's failure to monitor the fuel gauges and to recognize that the airplane's changing handlin characteristics were caused by a fuel imbalance.											
August 29, 2004	N810AE	Passenger	Clyde, NY	American Eagle Airlines	Embraer EMB-135KL	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise
Probable Cause: An unexpected encounter with clear air turbulence.											
August 30, 2004	N742RW	Cargo	El Paso, TX	Custom Air Transport	Boeing 727-2M7	Substantial	None	Damage	0	Dragged Wing,Rotor,Pod,Float Or Tail/Skid	Approach - VFR Pattern - Final Approach
Probable Cause: The first officer's failure to maintain aircraft control. Contributing factors were the captain's delayed remedial action and the crosswind.											
September 13, 2004	N601WN	Passenger	Los Angeles, CA	Southwest Airlines	Boeing 737-3H4	None	Serious	Injury	0	Vortex Turbulence Encountered	Approach
Probable Cause: The flight's encounter with the wake turbulence from a preceding heavy airplane while on approach.											
September 19, 2004	N601FE	Cargo	Memphis, TN	Federal Express	Boeing MD-11	Substantial	None	Damage	0	Hard Landing	Landing - Flare/Touchdown
Probable Cause: The pilot's over-rotation during a go-around maneuver initiated because of a bounced landing. The go-around maneuver was initiated at a low speed and high pitch angle, and after reverse thrust wa selected, contrary to Boeing and FedEx training guidance.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Aircraft Type	Damage to Aircraft	Highest Injury	Accident Severity	Total Fatalities	First Occurrence	Phase of Flight
September 29, 2004	N109DL	Passenger	Caribbean Sea,	Delta Air Lines	Boeing 767-232	None	Serious	Injury	0	In-flight Encounter with Weather	Cruise - Normal
Probable Cause: An inadvertent encounter with severe turbulence during cruise, which resulted in a flight attendant being injured.											
October 19, 2004	N875JX	Passenger	Kirksville, MO	Corporate Airlines	British Aerospace Jetstream 32	Destroyed	Fatal	Major	13	In-flight Collision with Object	Approach
Probable Cause: The pilots' failure to follow established procedures and properly conduct a nonprecision instrument approach at night in IMC, including their descent below the minimum descent altitude (MDA) before required visual cues were available (which continued unmoderated until the airplane struck the trees) and their failure to adhere to the established division of duties between the flying and nonflying (monitoring) pilot. Contributing to the accident was the pilots' failure to make standard callouts and the current Federal Aviation Regulations that allow pilots to descend below the MDA into a region in which safe obstacle clearance is not assured based upon seeing only the airport approach lights. The pilots' unprofessional behavior during the flight and their fatigue likely contributed to their degraded performance.											
October 20, 2004	N709CK	Cargo	Lake Michigan,	Kalitta Air	Boeing 747-132	Substantial	None	Damage	0		
Probable Cause: The number one engine separated from the airplane during climb due to the uncontained separation of a portion of the second stage turbine disk rim after the second stage turbine vanes contacted the disk. The second stage turbine vanes contacted the second stage turbine disk due to the operator's inadequate inspection of the high pressure turbine module and the improper repair of the module by unknown maintenance personnel.											
October 25, 2004	N376AE	Passenger	Fort Worth, TX	American Eagle Airlines	Saab-Scania AB (Saab) SF-340B	None	Serious	Injury	0	Propeller/Rotor Contact To Person	Taxi - Pushback/Tow
Probable Cause: The ground personnel's failure to maintain clearance from the propeller. Contributing factors were the ground personnel's failure to comply with procedures/directives and the ground personnel's failure to properly use equipment.											
October 27, 2004	N592ML	Passenger	Philadelphia, PA	Mesa Airlines, DBA US Airways Express	Bombardier CL-600-2B19	Substantial	Minor	Damage	0	On Ground/Water Collision with Object	Taxi - To Takeoff
Probable Cause: The flightcrew's misjudged clearance from a parked airport vehicle while taxiing. A factor was the vehicle operator's improper decision to park within a taxiway safety area.											
November 13, 2004	N305CE	Passenger	Milwaukee, WI	Chicago Express Airlines, DBA ATA Connection	Saab-Scania AB (Saab) 340B	None	Serious	Injury	0	Propeller/Rotor Contact To Person	Standing - Engine(s) Operating
Probable Cause: Failure of the ramp employee to maintain clearance to the rotating propeller resulting in inadvertent contact with a propeller blade.											
December 16, 2004	N748CC	Cargo	Ontario, Canada	Air Cargo Carriers	Short Brothers SD3-60	Destroyed	Serious	Major	0		
Probable Cause:											
December 20, 2004	N402A	Passenger	Providence, RI	American Airlines	McDonnell Douglas MD-82	Substantial	None	Damage	0	On Ground/Water Collision with Object	Taxi - Pushback/Tow
Probable Cause: The vehicle driver's failure to maintain directional control, which resulted in a collision with the airplane during push-back. A factor was the icy ramp area.											
December 29, 2004	N506MJ	Passenger	Austin, TX	Mesa Airlines	Bombardier CL-600-2C10	None	Serious	Injury	0	Miscellaneous/Other	Other

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
February 10, 2004	N1276P	Passenger	Toksook Bay, AK	Grant Aviation Inc.	Cessna 208B	Substantial	None	0	Loss of Control - On Ground/Water	Takeoff - Roll/Run
Probable Cause: The pilot's inadequate planning and decision to initiate a takeoff into a crosswind that exceeded the airplane's demonstrated crosswind component, which resulted in a loss of directional control during the takeoff roll, and subsequent collision with terrain and nose over. Factors contributing to the accident were the crosswind, an icy runway, and the pilot's failure to abort the takeoff.										
April 4, 2004	N22932	Passenger	Unalaska, AK	Peninsula Airways, DBA PenAir	Grumman G21	Substantial	None	0	Loss of Control - On Ground/Water	Landing - Roll
Probable Cause: The inadvertent ground loop/swerve by the second pilot during the landing roll, and the first (check) pilot's inadequate supervision of the second pilot, which resulted in a loss of control and substantial damage to the airplane. Factors associated with the accident are the second pilot's improper upgrade/transition training by the company check airman, the second pilot's lack of experience in the accident type airplane, the operator's lack of surveillance of the training process, and a crosswind.										
September 17, 2004	N41185	Passenger	Telida, AK	Tatonduk Outfitters LTD., DBA Everts Air Alaska	Piper PA-31-350	Substantial	None	0	Wheels Up Landing	Landing - Flare/Touchdown
Probable Cause: A failure of the pilot-in-command to extend the landing gear, which resulted in a gear-up landing and structural damage to the airplane.										
October 11, 2004	N5277J	Passenger	Chefornak, AK	Hageland Aviation	Cessna 207	Substantial	None	0	In-flight Collision with Object	Approach - VFR Pattern - Final Approach
Probable Cause: The in-flight collision with a bird while on final approach to land.										

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
January 2, 2004	N45008	Cargo	Koyukuk, AK	Larrys Flying Service	Airplane	Piper PA-31-350	Substantial	Serious	0	In-flight Encounter with Weather	Maneuvering
Probable Cause: The pilot's continued flight into adverse weather conditions, and his failure to maintain clearance from terrain, which resulted in an in-flight collision with terrain. Factors associated with the accident were fog and whiteout weather conditions.											
January 3, 2004	N911EA	Passenger and Cargo	Window Rock, AZ	Scenic Aviation	Airplane	Cessna 421C	Substantial	None	0	In-flight Encounter with Weather	Approach - Circling (IFR)
Probable Cause: The pilot's failure to maintain adequate airspeed in the landing flare to compensate for airframe icing, which resulted in a premature stall and hard landing. The degraded aircraft performance due to airframe ice was a contributing factor.											
January 8, 2004	N48TA	Passenger	Galesburg, IL	Tidewater Aero	Airplane	Beech E-90	Substantial	None	0	Miscellaneous/ Other	Climb
Probable Cause: The pilot's inadequate preflight by not complying with the airplane's before takeoff checklist to verify that the cabin door was secured leading to its in-flight separation from the airplane. A factor was that the door was not secured.											
January 21, 2004	N8701E	Cargo	Big Pine, CA	Ameriflight	Airplane	Piper PA-32R-300	Destroyed	Fatal	1		
Probable Cause: Failure of the pilot to maintain clearance with mountainous terrain for undetermined reasons.											
January 28, 2004	N207RT	Passenger	Patterson, LA	Rotorcraft Leasing	Helicopter	Bell 206-L4	Substantial	None	0	In-flight Collision with Object	Cruise
Probable Cause: The in-flight separation of the helicopter's left winglet due to pre-existing cracks resulting in the winglet striking the tail rotor in-flight, and subsequent loss of directional control.											
February 20, 2004	N24RZ	Passenger	Fort Lauderdale, FL	Aztec Captital, DBA Skylink Jets	Airplane	Gates Learjet 25B	Substantial	Serious	0	In-flight Encounter with Weather	Cruise - Normal
Probable Cause: The pilot in command's misjudged distance/speed while landing, and the flightcrew's failure to follow prescribed emergency procedures, which resulted in a runway overrun and subsequent collision with a building. Factors associated with the accident are the flightcrew's inadequate in-flight planning/decision making, which resulted in a low fuel condition; an open hydraulic relief valve, and inadequate maintenance by company maintenance personnel. Additional factors were an inoperative (normal) brake system, an unactivated emergency drag chute, the flightcrew's failure to engage the emergency brake system, and pressure placed on the flightcrew due to conditions/events.											
March 6, 2004	N81SP	Passenger	W. Cameron 149, GM	Petroleum Helicopters	Helicopter	Bell 206L-3	Substantial	Minor	0	Loss of Engine Power	Takeoff - Initial Climb
Probable Cause: A partial loss of engine power due to undetermined reasons. A contributing factor was the emergency floats not being deployed.											
March 9, 2004	N99AT	Passenger	Peach Springs, AZ	King Airlines	Airplane	Cessna 402A	Substantial	None	0		
Probable Cause: The pilot's inadequate flare and touchdown that imparted high side loadings on the right main landing gear, which resulted in an overload failure of the landing gear bellcrank and the collapse of that gear.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
March 13, 2004	N11FL	Passenger	Fort Lauderdale, FL	Execstar Aviation	Airplane	Beech BE90	Substantial	None	0	Airframe/Component/System Failure/Malfunction	Approach
Probable Cause: The inadequate inspection of the landing gear system by company maintenance personnel resulting in a crack in the left main landing actuator mount going undetected and collapse of the left landing gear during landing roll when the actuator attachment failed.											
March 19, 2004	N800AW	Cargo	Utica, NY	Airnet Systems	Airplane	Gates Learjet 35A	Substantial	None	0	Loss of Control - In-flight	Approach - FAF/Outer Marker To Threshold (IFR)
Probable Cause: The copilot's failure to maintain airspeed, and the captain's delayed remedial action, which resulted in an inadvertent stall and the subsequent hard landing.											
March 21, 2004	N223CS	Passenger	Kaktovik, AK	Cape Smythe Air Service	Airplane	Piper PA-31T3	Substantial	None	0	On Ground/Water Encounter with Terrain/Water	Landing - Roll
Probable Cause: The pilot's selection of unsuitable terrain for landing, which resulted in the airplane colliding with drifted snow during the landing roll. Factors contributing to the accident were a snow covered runway, airport personnel's failure to remove accumulate snow on the runway, and flat light conditions at the airport.											
March 21, 2004	N502MT	Passenger	Pyote, TX	Med-Trans, DBA CareStar	Helicopter	Bell 407	Destroyed	Fatal	4	In-flight Encounter with Weather	Cruise - Normal
Probable Cause: The pilot's inadvertent encounter with adverse weather, which resulted in the pilot failing to maintain terrain clearance. Contributing factors were the dark night conditions, the pilot's inadequate preflight preparation and planning, and the pressure to complete the mission induced by the pilot as a result of the nature of the EMS mission.											
March 23, 2004	N579EH	Passenger	Gulf of Mexico	ERA Aviation	Helicopter	Sikorsky S76A++	Destroyed	Fatal	10	In-flight Collision with Terrain/Water	Cruise
Probable Cause: The flight crew's failure to identify and arrest the helicopter's descent for undetermined reasons, which resulted in controlled flight into terrain.											
March 25, 2004	N201UV	Cargo	Pittsfield, MA	Royal Air Freight	Airplane	Mitsubishi MU-2B-36	Substantial	Fatal	1	In-flight Encounter with Weather	Cruise
Probable Cause: The pilot's loss of aircraft control for undetermined reasons, which resulted in an inadvertent stall/spin and subsequent impact with the ground.											
March 31, 2004	N269JH	Cargo	Walker's Cay, Bahama	Tropic Air Charters	Airplane	Cessna 402B	Substantial	None	0		
Probable Cause:											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
April 18, 2004	N8198A	Passenger	Holoaloa, HI	Above It All, DBA Island Hoppers	Airplane	Piper PA 28-161	Destroyed	Serious	0	In-flight Encounter with Weather	Cruise
Probable Cause: The pilot's continued flight into adverse weather conditions that resulted in an in-flight collision with mountainous terrain. Factors in the accident were rising terrain, low clouds and rain, and the pilot's lack of familiarity with the geographic area.											
April 20, 2004	N137AE	Passenger	Boonville, IN	Air Evac EMS, DBA Air Evac Life Team	Helicopter	Bell 206L-1	Substantial	Fatal	1	In-flight Collision with Terrain/Water	Cruise - Normal
Probable Cause: The pilot's inadequate planning/decision which resulted in his failure to maintain terrain clearance. Contributing factors were the pilot's inadequate preflight planning, his diverted attention, and the dark night conditions.											
April 30, 2004	N130AL	Passenger	Deadhorse, AK	Air Logistics of Alaska	Helicopter	Bell 206L-3	Substantial	Fatal	1	In-flight Encounter with Weather	Maneuvering
Probable Cause: The pilot's continued VFR flight into instrument meteorological conditions (IMC), and his spatial disorientation and loss of control during a subsequent landing. Factors associated with the accident are flat light and whiteout conditions, fog, and snow-covered terrain.											
May 2, 2004	N35860	Passenger	Nanwalek, AK	Smokey Bay Air	Airplane	Cessna U206F	Substantial	None	0	Loss of Control - In-flight	Takeoff - Initial Climb
Probable Cause: A loss of directional control for an undetermined reason during takeoff-initial climb, which resulted in the left wing colliding with the ground.											
May 11, 2004	N60618	Passenger	Skagway, AK	Temsco Helicopters	Helicopter	Aerospatiale AS-350B2	Substantial	None	0	Loss of Engine Power(Total) - Nonmechanical	Cruise
Probable Cause: A loss of engine power during cruise flight for an undetermined reason, which resulted in a ditching and submersion of the helicopter when the emergency float system did not deploy. Factors contributing to the accident were improper rigging of the mechanical activation mechanism for the emergency floats by company maintenance personnel, and the failure of the pilot to utilize the electrical firing system to activate the emergency floats.											
May 14, 2004	N755AF	Cargo	Ferndale, MD	Epps Air Service	Airplane	Mitsubishi MU-2B-60	Destroyed	Fatal	1	Loss of Control - In-flight	Approach - VFR Pattern - Base Turn
Probable Cause: The pilot's failure to maintain airspeed during a sharp turn, which resulted in an inadvertent stall and subsequent impact with terrain. Factors included the pilot's failure to fly to the intended point of landing, and his abrupt course reversal back towards it.											
June 14, 2004	N401CK	Cargo	Kodiak, AK	Bellair	Airplane	Beech C-45H	Destroyed	Fatal	1	In-flight Collision with Object	Missed Approach (IFR)
Probable Cause: The pilot's failure to follow proper IFR procedures by not adhering to the published missed approach procedures, which resulted in an in-flight collision with tree-covered terrain. Factors contributing to the accident were a low ceiling, fog, rain, and the insufficient operating standards of company management by allowing unauthorized single pilot instrument flight operations. Additional factors were the pilot's impairment from cocaine, alcohol, and over the counter cold medication, and the FAA's inadequate medical certification of the pilot and follow-up of his known substance abuse problems.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
June 24, 2004	N5006F	Passenger and Cargo	Vermillion Bay, LA	American Helicopters	Helicopter	Bell 206-L1	Destroyed	Fatal	3	In-flight Encounter with Weather	Cruise
Probable Cause: The pilot's continued flight into adverse weather conditions resulting in a loss of control. Contributing factors were the prevailing thunderstorms and the pilot's inadequate in flight preparation and planning.											
June 30, 2004	N432FA	Passenger	Green Bay, WI	Frontline Aviation	Airplane	Beech 200	Substantial	None	0	Loss of Engine Power	Takeoff - Initial Climb
Probable Cause: The loss of engine power for an undetermined reason and the pilot's premature retraction of the landing gear after takeoff.											
July 2, 2004	N280AT	Passenger	Tocumen, Panama	Air Trek	Airplane	Israel Aircraft Industries 1124	Destroyed	Fatal	7		
Probable Cause:											
July 8, 2004	N196BH	Passenger	Hilo, HI	Blue Hawaiian Helicopters	Helicopter	Eurocopter AS350 B2	Substantial	Minor	0	In-flight Encounter with Weather	Cruise
Probable Cause: The pilot's inadequate planning/decision by his VFR flight into IMC, and his failure to maintain obstacle clearance which resulted in an in-flight collision with a tree. A low ceiling and fog were contributing factors.											
July 11, 2004	C-GLHQ	Passenger and Cargo	Nome, AK	Prism Helicopters	Helicopter	Hughes 369D	Substantial	None	0	Miscellaneous/ Other	Standing
Probable Cause: The pilot's inadequate compensation for wind conditions while the helicopter was standing, which resulted in the coasting main rotor blade contacting the tail boom. A factor associated with the accident was the gusty wind condition.											
July 12, 2004	N91MH	Passenger	Peach Springs, AZ	Maverick Helicopter	Helicopter	Eurocopter France AS350 B2	Substantial	None	0	Loss of Control - In-flight	Takeoff - Initial Climb
Probable Cause: The pilot's selection of downwind takeoff direction and improper use of the collective control prior to reaching translational lift, which resulted in a settling with power condition and a collision with the ground. Also causal was the pilot's failure to maintain main rotor rpm.											
July 13, 2004	N503MT	Passenger	Newberry, SC	Med-Trans, DBA Regional One	Helicopter	Bell 407	Destroyed	Fatal	4	In-flight Encounter with Weather	Takeoff - Initial Climb
Probable Cause: The pilot's failure to maintain terrain clearance as a result of fog conditions. A contributing factor was inadequate weather and dispatch information relayed to the pilot.											
July 14, 2004	N277LF	Passenger	Louie Lake, ID	CJ Systems Aviation Group	Helicopter	Bell 222U	Substantial	None	0	Hard Landing	Takeoff - Aborted
Probable Cause: The failure of the pilot to maintain rotor rpm and his inadequate recovery from a bounced landing. Factors contributing to the accident included the tailwind condition and the tree.											
July 21, 2004	N133RT	Passenger	East Cameron 13, GM	Omni Energy Services	Helicopter	Bell 206B	Substantial	Minor	0	Loss of Engine Power	Cruise
Probable Cause: The loss of engine power due to fuel exhaustion. Contributing factors were the fuel quantity gauge's improper fuel level indication, missing instrument placard, company maintenance personnel's improper maintenance records, disregard for company procedures, and the inadequate surveillance by company personnel.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
August 4, 2004	N1037N	Cargo	Big Rapids, MI	Superior Aviation	Airplane	Cessna 208B	Substantial	None	0	Airframe/Component/System Failure/Malfunction	Cruise
Probable Cause: The pilot's failure to verify that the cargo door was latched properly prior to flight and the subsequent in-flight opening of the door. A contributing factor was the box which departed the cargo compartment and struck the horizontal stabilizer.											
August 4, 2004	N300SN	Cargo	Huslia, AK	Arctic Circle Air	Airplane	Cessna 402C	Substantial	None	0	Wheels Up Landing	Landing - Flare/Touchdown
Probable Cause: The pilot's failure to extend the landing gear, which resulted in an inadvertent wheels up landing. A factor associated with the accident was the pilot's diverted attention.											
August 7, 2004	N645RF	Cargo	Palmer, AK	Gary Lee Bishop	Airplane	Piper PA-18	Substantial	None	0	Undershoot	Approach - VFR Pattern - Final Approach
Probable Cause: The pilot's misjudged distance/altitude during the final approach phase of landing, which resulted in an undershoot and subsequent collision with terrain.											
August 13, 2004	N9752Z	Passenger	Rose Lake, ID	Brooks Seaplane Service	Airplane	Cessna U206G	Substantial	None	0	In-flight Collision with Object	Approach - VFR Pattern - Final Approach
Probable Cause: The pilot's failure to maintain clearance with the powerlines on final approach which resulted in a hard landing. A factor contributing the to accident were the powerlines.											
August 17, 2004	N199GL	Passenger and Cargo	Neihart, MT	Alpine Air	Airplane	Beech BE-99	Destroyed	Fatal	2	In-flight Collision with Terrain/Water	Cruise
Probable Cause: The pilot's failure to maintain adequate terrain clearance during cruise, which resulted in the in-flight collision with mountainous terrain. Dark night conditions and mountainous terrain were contributing factors.											
August 21, 2004	N2YN	Passenger	Battle Mountain, NV	Jeflyn Aviation, DBA Access Air	Helicopter	Bell 407	Destroyed	Fatal	5	In-flight Encounter with Weather	Cruise
Probable Cause: The pilot's failure to maintain clearance from mountainous terrain. Contributing factors were the pilot's improper decision to take the direct route over mountainous terrain, the dark night conditions, and the pressure to complete the mission induced by the pilot as a result of the nature of the EMS mission.											
August 24, 2004	N107PH	Passenger	Panama City, FL	Heliworks	Helicopter	Bell 206B3	Substantial	None	0	Loss of Engine Power(Partial) - Mech Failure/Malf	Maneuvering
Probable Cause: Inadequate maintenance inspection resulting in the partial loss of engine power due to a loose pneumatic line on the governor and ditching of the helicopter.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
August 26, 2004	N8597D	Passenger	Paxson, AK	40 Mile Air	Airplane	Piper PA-18	Substantial	None	0	On Ground/Water Encounter with Terrain/Water	Landing - Roll
Probable Cause: The pilot's selection of unsuitable terrain for landing, which resulted in a collision with a rock and subsequent main landing gear collapse during the landing roll. A factor contributing to the accident was rough, uneven terrain.											
September 4, 2004	N47MR	Passenger	Colorado Spring, CO	American Jets	Airplane	Gates Learjet 25B	Substantial	None	0	Airframe/Component/System Failure/Malfunction	Takeoff - Roll/Run
Probable Cause: Right main tire failure for reasons undetermined.											
September 8, 2004	N5774C	Cargo	Charleston, WV	Race City Air	Airplane	Cessna 402C	Substantial	None	0	Overrun	Takeoff - Aborted
Probable Cause: The pilot's improper decision to abort the takeoff with insufficient runway remaining. A factor was the wet runway.											
September 9, 2004	N6209J	Cargo	Rachel, TX	San Antonio Piper	Airplane	Piper PA-32R-300	Destroyed	Fatal	1	Loss of Control - In-flight	Descent
Probable Cause: The total failure of the vacuum pump that resulted in an inoperative attitude gyro and spatial disorientation and a subsequent loss of aircraft control by the pilot. Factors were; the prevailing instrument meteorological conditions, and the dark night light condition.											
September 18, 2004	N408TE	Cargo	New Century, KS	Telesys Transair	Airplane	Cessna 401	Substantial	Minor	0	In-flight Encounter with Weather	Approach
Probable Cause: A loss of engine power due to fuel starvation and the pilot's failure to maintain directional control during approach to an alternate airport. Contributing to the accident was the pilot's failure to obtain a weather briefing, his flight into adverse weather, and the thunderstorm.											
September 20, 2004	N712TS	Passenger	Sitka, AK	Harris Aircraft Services	Airplane	de Havilland DHC-2	Destroyed	Fatal	5	Missing Aircraft	Unknown
Probable Cause: Reason for occurrence is undetermined. The airplane is missing.											
September 23, 2004	N6522T	Passenger	Kodiak, AK	Homer Air	Airplane	Britten-Norman BN-2A	Substantial	Serious	0	Loss of Control - In-flight	Takeoff - Initial Climb
Probable Cause: The pilot's inadequate compensation for wind conditions, and his intentional flight into adverse weather conditions, which resulted in a loss of control and collision with terrain during takeoff-initial climb. Factors contributing to the accident were high and gusty wind conditions, and the pilot's inadequate preflight planning.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
September 23, 2004	N7392B	Cargo	Gwinner, ND	Eagle Air Cargo	Airplane	Cessna 208B	Substantial	Serious	0	In-flight Collision with Terrain/Water	Approach - Circling (IFR)
Probable Cause: The pilot's failure to maintain altitude during the circling maneuver. Contributing factors were the pilot's improper decision to execute the approach when weather conditions were below minimums and the low light (dark night) conditions.											
September 24, 2004	N1018D	Passenger	Willow, AK	Susitna Air Service	Airplane	de Havilland DHC-2	Substantial	None	0	On Ground/Water Collision with Object	Landing - Roll
Probable Cause: The pilot's selection of an unsuitable landing area, which resulted in an on-ground collision with trees during the landing roll. A factor associated with the accident were trees.											
September 29, 2004	N34CA	Passenger	Gulf of Mexico	Panther Helicopters	Helicopter	Bell 206L	Destroyed	None	0	Loss of Engine Power	Approach - VFR Pattern - Final Approach
Probable Cause: A loss of engine power for undetermined reasons while on short final to land on an oil platform in the Gulf of Mexico, which resulted in the pilot ditching the helicopter into the water.											
September 29, 2004	N902GD	Cargo	Vega Baja, PR	Air Charter, DBA Air Flamenco	Airplane	Britten-Norman BN-2A-27	Destroyed	Fatal	1	In-flight Encounter with Weather	Cruise - Normal
Probable Cause: The pilot's improper inflight planning which resulted in an inflight encounter with weather (low ceilings and thunderstorms), his loss of aircraft control, and an inflight collision with the ocean during uncontrolled descent.											
September 29, 2004	N276PM	Cargo	Decatur, IL	Planemasters	Airplane	Cessna 208B	Substantial	None	0		
Probable Cause: The pilot's inadequate preflight preparation, and his subsequent selection of a runway for takeoff that was listed as out of service, resulting in a collision with barricades and uneven terrain during takeoff.											
October 12, 2004	N166EH	Passenger	Ketchikan, AK	Era Aviation	Helicopter	Eurocopter France AS-350B2	Substantial	None	0	In-flight Collision with Object	Landing
Probable Cause: The pilot's failure to maintain clearance from an object while landing, which resulted in the main rotor blades striking a tree.											
October 17, 2004	N955AA	Cargo	Billings, MT	Alpine Air	Airplane	Beech 99A	Substantial	None	0	In-flight Collision with Object	Approach - IAF To FAF/Outer Marker (IFR)
Probable Cause: The pilot's failure to follow the instrument approach procedure, which resulted in a premature descent below the decision height and subsequent collision with a building.											

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
October 27, 2004	N6108Y	Cargo	Raymond, MS	Flight Express	Airplane	Cessna T210N	Destroyed	Minor	0	Loss of Engine Power(Total) - Mech Failure/Malf	Cruise - Normal
Probable Cause: The total loss of engine power which was initiated by fretting of the crankcase halves for undetermined reasons, causing rotation of several of the main bearings, oil starvation, and subsequent failure of several of the connecting rods. A contributing factor was the rough terrain.											
November 5, 2004	N496RL	Passenger	S.Timbelier 187, GM	Rotorcraft Leasing	Helicopter	Bell 206B	Destroyed	Serious	0	Loss of Engine Power	Cruise
Probable Cause: The loss of engine power for undetermined reasons.											
November 9, 2004	N1075P	Passenger	Sapulpa, OK	Air Evac Life Team, DBA Air Evac	Helicopter	Bell 206L1	Substantial	Minor	0	Airframe/Component/System Failure/Malfunction	Cruise
Probable Cause: The loss of tail rotor drive as a result of a blanket coming in contact with the tail rotor blades, after the baggage compartment door unlatched during flight. A contributing factor was the "dusk" light condition that prevailed at the time of the accident.											
November 9, 2004	N162WA	Cargo	Boise, ID	Transportation Systems, DBA Western Airlines	Airplane	Swearingen SA226TC	Substantial	None	0	In-flight Collision with Object	Approach - FAF/Outer Marker To Threshold (IFR)
Probable Cause: The pilot's failure to maintain the required glidepath, and his failure to maintain obstacle clearance after visual contact with the runway during the instrument approach.											
November 19, 2004	N1049C	Cargo	Phoenix, AZ	Ameriflight	Airplane	Beech 99	Substantial	None	0	On Ground/Water Collision with Object	Taxi
Probable Cause: The pilot's inadequate visual lookout and failure to maintain clearance from obstacles while taxing in a nonmovement area at night.											
November 27, 2004	N960BW	Passenger and Cargo	Bagram, Afghanistan	Presidential Airways	Airplane	CASA 212-200-CC	Destroyed	Fatal	6		
Probable Cause: The captain's inappropriate decision to fly a nonstandard route and his failure to maintain adequate terrain clearance, which resulted in the inflight collision with mountainous terrain. Factors were the operator's failure to require its flight crews to file and to fly a defined route of flight, the operator's failure to ensure that the flight crews adhered to company policies and FAA and DoD Federal safety regulations, and the lack of in-country oversight by the FAA and the DoD of the operator. Contributing to the death of one of the passengers was the operator's lack of flight-locating procedures and its failure to adequately mitigate the limited communications capability at remote sites.											
November 28, 2004	N873G	Passenger	Montrose, CO	Air Castle, DBA Hop-A-Jet	Airplane	Canadair CL-600-2A12	Destroyed	Fatal	3	On Ground/Water Encounter with Weather	Takeoff

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
Probable Cause: The flight crew's failure to ensure that the airplane's wings were free of ice or snow contamination that accumulated while the airplane was on the ground, which resulted in an attempted takeoff with upper wing contamination that induced the subsequent stall and collision with the ground. A factor contributing to the accident was the pilots' lack of experience flying during winter weather conditions.											
November 30, 2004	N941MA	Cargo	Philadelphia, PA	Epps Air Service	Airplane	Mitsubishi MU-2B-60	Substantial	None	0	On Ground/Water Collision with Object	Takeoff - Aborted
Probable Cause: The failure of the ground controller to coordinate the runway crossing of a maintenance tug, with the local controller, which resulted in a ground collision with an MU-2 airplane during it's takeoff roll.											
December 6, 2004	N25SA	Cargo	Bellevue, ID	Mountain Bird, DBA Salmon Air	Airplane	Cessna 208B	Destroyed	Fatal	2	Loss of Control - In-flight	Approach - FAF/Outer Marker To Threshold (IFR)
Probable Cause: The pilot's failure to maintain aircraft control while on approach for landing in icing conditions. Inadequate airspeed was a factor.											
December 7, 2004	N54316	Cargo	Vandalia, OH	Tiffin Aire	Airplane	Piper PA-31-350	Destroyed	Fatal	1	In-flight Collision with Object	Approach
Probable Cause: The pilot's failure to maintain adequate altitude\clearance while on approach, which resulted in an in-flight collision with trees. Factors in the accident were the fog and low ceiling conditions.											
December 7, 2004	N592DM	Cargo	Flagstaff, AZ	Distribution Management Corp, DBA Aero Charter and Transport (Char-Trans)	Airplane	Cessna T310R	Destroyed	Fatal	1		
Probable Cause: The pilot's decision to attempt flight into known adverse weather conditions beyond the capability of the airplane and his failure to ensure that the airplane's wings were free of ice and/or snow contamination that accumulated while the airplane was on the ground, which resulted in an attempted takeoff with upper wing contamination that induced a subsequent stall/mush and a collision with the ground.											
December 10, 2004	N538EA	Cargo	Englewood, CO	Flight Line	Airplane	Mitsubishi MU-2B-60	Destroyed	Fatal	2	Loss of Engine Power	Takeoff - Initial Climb
Probable Cause: The pilot's failure to maintain minimum controllable airspeed during the night visual approach resulting in a loss of control and uncontrolled descent into terrain. A contributing factor was the precautionary shutdown of the left engine for undetermined reasons.											
December 10, 2004	N648KA	Passenger	Bay View, TX	Charter 1	Airplane	Beech BE-200	Destroyed	None	0	Loss of Control - In-flight	Takeoff - Initial Climb
Probable Cause: The pilot's failure to maintain directional control as result of his improper runway selection for takeoff. A contributing factor was the prevailing right quartering tailwind.											
December 15, 2004	N792FC	Passenger	Utopia, AK	Warbelows Air Ventures	Airplane	Piper PA-31-350	Substantial	None	0	Overrun	Landing - Roll

Date	Registration Number	Type of Operation	Location	Operator of Aircraft	Category	Aircraft Type	Damage to Aircraft	Highest Injury	Total Fatalities	First Occurrence	Phase of Flight
Probable Cause: The pilot's misjudged distance/speed while on final approach to land, which resulted in an overrun during the landing roll. Factors associated with the accident are the pilot's inadequate weather evaluation, and a gusty tailwind.											
December 17, 2004	N976AA	Passenger and Cargo	Ship Shoal 130E, GM	Omni Energy Services	Helicopter	Bell 407	Destroyed	Fatal	1	In-flight Collision with Object	Hover - In Ground Effect
Probable Cause: The pilot's failure to maintain clearance with a stationary object while maneuvering for landing. Contributing factors were the inadequate facilities available for landing, the pilot's lack of information regarding the landing area, and the operational status of the offshore platform.											

Appendix B: Definitions of Terms Used in the Review

Air Carrier Operations

Air carriers are generally defined as operators that fly aircraft in revenue service. The *Review of 2004 Aircraft Accident Data: U.S. Air Carrier Operations* covers accidents involving aircraft operated by U.S. air carriers under Title 14[1] Parts 121 and 135 of the *Code of Federal Regulations* (CFR). This review does not discuss general aviation aircraft,[2] foreign-operated aircraft, ultralight vehicles, experimental aircraft, and commercial space launches.

Part 121 Operations

Part 121 operations are any scheduled or non-scheduled passenger-carrying operations that adhere to regulations that limit operations to controlled airspace and controlled airports for which specific weather, navigational, operational, and maintenance support services are available. These operations usually include operators that fly large transport-category aircraft. An operation is scheduled if an air carrier or operator offers in advance the departure location, departure time, and arrival location.[3] As a result, "Part 121" typically applies to major airlines and cargo carriers that fly large transport-category aircraft serving large airports. The operating rules for scheduled and nonscheduled Part 121 operators are generally the same.

Part 135 Operations

Part 135 operations must adhere to requirements that are similar to those of Part 121 (with some notable differences with respect to aircraft and airport characteristics, and to crew training and experience). However, Part 135 operations are allowed to service rou tes to smaller airports that do not have the weather, communications, and navigational capabilities required of the larger airports serving Part 121 operations. Part 135 typically applies to commercial carriers flying smaller jet and turboprop aircraft commonly referred to as commuter airlines (*scheduled* Part 135) and air taxis (*on-demand* Part 135).

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[1] Title 14 is also known as the *Federal Aviation Regulations* (FAR).

[2] A separate review, published annually by the Safety Board, summarizes accident statistics for these aircraft.

[3] Title 14 *Code of Federal Regulations* (CFR) Part 119.3.

In March 1997, the regulations defining Part 121 operations changed to include scheduled aircraft with more than 10 seats. Previously, scheduled aircraft with fewer than 30 passenger seats were operated under Part 135. As a result, after 1997, most carriers once popularly known as "commuters" began operating as Part 121 flights.

Scheduled Part 135 Operations

According to 14 CFR Part 119.3, a *scheduled* operation is any "passenger-carrying operation for compensation or hire conducted by an air carrier or commercial operator for which the certificate holder or its representative offers in advance the departure location, departure time, and arrival location." Scheduled Part 135 carriers typically fly aircraft with single/twin turbine engines or single/twin piston engines. Such carriers are more likely to fly short routes and are concentrated for the most part in Alaska.

On-Demand Part 135 Operations

An *on-demand* Part 135 operation is any operation for compensation or hire for which the departure location, departure time, and arrival location are negotiated with the customer. Customers can charter an entire aircraft or book a single seat on an air taxi. The FAA estimates the number of on-demand Part 135 operators at about 3,000; of those operators, approximately 2,500 offer service in airplanes and 500 offer service in helicopters.[4] On-demand Part 135 air carriers are typically characterized as offering one of three types of services: air taxi or charter; air tour; or air medical. Historically, on-demand Part 135 operations represent about half of the air carrier fleet and account for about 15% of all air carrier flight hours.

[4] Accurate data for on-demand Part 135 operators and aircraft are difficult to obtain. The figures cited in this review are from *Chartering an Aircraft: A Consumer Guide* (Washington, DC: Federal Aviation Administration, Office of Public Affairs). The 2000 *General Aviation and Air Taxi Activity* (*GAATAA*) *Survey*, shows a total of 4,000 air taxi and air tour aircraft (not separated into airplanes and helicopters) in Table GA 00 1-3.

Its *on-demand* nature is the important characteristic of this type of operation. On-demand Part 135 operators offer charter or air taxi flights on a flexible schedule and carry passengers or cargo (and in some cases, both) to a variety of airports that are not usually serviced by scheduled airlines.[5] An on-demand operation can serve corporate customers who need a flexible schedule but do not wish to support their own corporate flight department. On-demand Part 135 operations also include medical evacuation flights when a patient is on board the aircraft, and helicopter flights serving offshore drilling platforms in the Gulf of Mexico. On-demand Part 135 operations are evenly distributed throughout the United States and include both short and long routes that serve the specific needs of charter and air taxi customers. On-demand Part 135 aircraft range from single-engine piston aircraft to large corporate jets that are typically smaller than those used in Part 121 operations.

Safety Board Severity Classification of Part 121 Accidents

Since 1997, the Safety Board has used a classification system for Part 121 and other air carrier accidents based on accident severity. Developed in response to a congressional requirement,[6] the system uses classifications that characterize both injury and damage. Definitions for level of injury and level of damage in Part 121 accidents are the same as those used to classify Part 135 accidents. The definitions of Safety Board Severity Classifications for Part 121 accidents are provided below:

Major	An accident in which at least one of the conditions is met: • Part 121 aircraft was destroyed, or • There were multiple fatalities, or • There was one fatality and a Part 121 aircraft was substantially damaged.
Serious	An accident in which at least one of the conditions is met: • There was one fatality without substantial damage to a Part 121 aircraft, or • There was at least one serious injury and a Part 121 aircraft was substantially damaged.

[5] FARs restrict on-demand Part 135 operations to passenger-carrying operations conducted as a public charter; scheduled passenger-carrying operations of less than five round trips per week on at least one route between two or more points according to the published flight schedules; and all-cargo operations conducted with airplanes having a payload capacity of 7,500 pounds or less, or with rotorcraft. A final rule change to the FARs effective November 17, 2003 (*Federal Register*, vol. 68, no. 180, September 17, 2003, pp. 54520-54588), concerning fractional ownership programs (which heretofore operated under Part 91) may significantly affect on-demand Part 135 operations. The rule change may require some fractional ownership programs to operate as if they were certified as on-demand Part 135.

[6] The classification system was introduced in 1997 as a requirement of the FAA Reauthorization Act of 1996 (and put into effect by Public Law 104-264, Sec. 407; amendment to *United States Code*, Title 49, Subtitle II, Chapter 11, Section 1119) for the Safety Board to provide "clearer descriptions of accidents associated with air transportation, including a more refined classification of accidents which involve fatalities, injuries, or substantial damage and which are only related to the operation of an aircraft." Before 1997, accident severity was characterized in terms of injuries (fatal, serious, minor, or none) or aircraft damage (destroyed, substantial, minor, or none).

Injury	A nonfatal accident with at least one serious injury and without substantial damage to an aircraft.
Damage	An accident in which no person was killed or seriously injured, but in which any aircraft was substantially damaged.

Safety Board Classification of Part 135 Accidents

Like Part 121 accidents, Part 135 accidents (both scheduled and on-demand) are classified by highest *level of injury* (fatal, serious, minor, or none) and *level of aircraft damage* (destroyed, substantial, minor, or none), as summarized below.

Definitions for Level of Injury

Fatal	Any injury that results in death within 30 days of the accident.
Serious	Any injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5% of the body surface.
Minor	Any injury that is neither fatal nor serious.
None	No injury.

Definitions for Level of Aircraft Damage

Destroyed	Damage due to impact, fire, or in-flight failures to an extent not economically repairable.
Substantial	Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small puncture holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered “substantial damage” for the purpose of this part.
Minor	Any damage that neither destroys the aircraft nor causes substantial damage.
None	No damage.

Appendix C: How Accident Data in the Review Are Collected and Analyzed

National Transportation Safety Board aircraft accident data reviews present accident data in two ways: by the number of accidents and by accident rate. For Part 121 and scheduled Part 135 operations, accident rates are calculated using three flight activity measures: flight hours, departures, and miles flown. Appendix C describes the data collection process, how those data are coded, and how the flight activity measures are compiled and used to calculate accident rates.

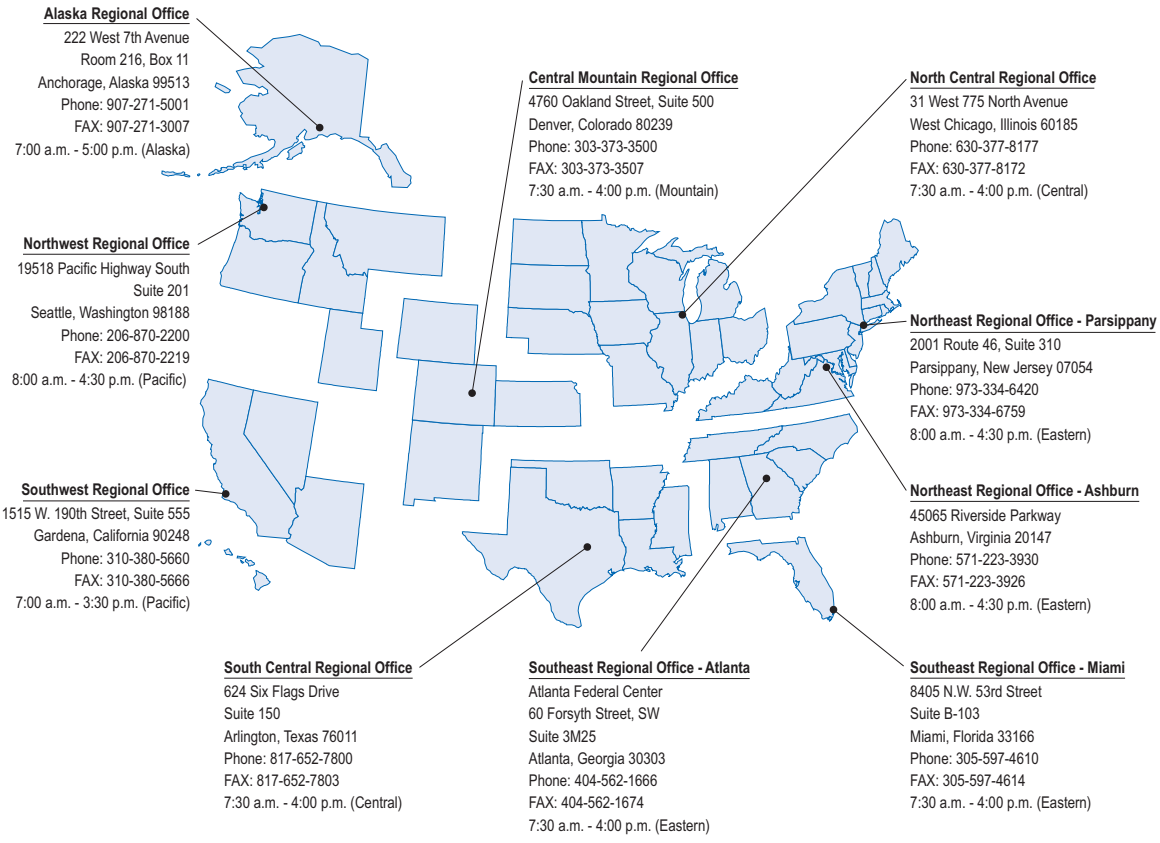
Accident Data: The Safety Board's Investigative Process

The Safety Board investigates every civil aviation accident that occurs in the United States. It also provides investigators to serve as U.S. Accredited Representatives, as specified in international treaties and agreements, for aviation accidents that occur overseas and that involve aircraft registered in the U.S. or aircraft or major components of U.S. manufacture.[1] Investigations are conducted by Safety Board Headquarters staff based in Washington, D.C., or by staff based in one of the regional offices.

Although the Safety Board investigates all civil aviation accidents that occur on U.S. soil (including those involving domestic and foreign operators), the *Review of 2004 Aircraft Accident Data: U.S. Air Carrier Operations* describes accidents that occur among U.S.-operated aircraft in all parts of the world.

[1] For more detailed information about the criteria for Safety Board investigation of an aviation accident or incident, see Title 49 *Code of Federal Regulations (*CFR) 831.2.

National Transportation Safety Board Regional Offices



The Safety Board's Aviation Accident/Incident Database

The Safety Board maintains the Accident/Incident Database, the government's official repository of aviation accident data and causal factors for civil aviation accidents. The database was established in 1962 by the Safety Board's predecessor agency, the Civil Aeronautics Board, and approximately 1,900 new event records are added each year. Each record contains data about the aircraft, environment, injuries, sequence of accident events, and other topics. The database is available to the public at <ftp://www.ntsb.gov/avdata/>. A database query tool is also available at <http://www.ntsb.gov/ntsb/query.asp#query_start> to search for sets of accidents using such information as date, location, and category of aircraft.

The Safety Board's database is primarily composed of aircraft accidents. An "accident" is defined in 49 CFR Part 830.2 as—

> an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.[2]

The database also contains fields for documenting selected aviation "incidents," defined in 49 CFR Part 830.2 as "an occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations."

During an investigation, Safety Board investigators collect information from a variety of sources, including the aircraft crew, the Federal Aviation Administration (FAA), manufacturers, and witnesses. Investigators use the Board's Accident Data Management System (ADMS) to document those data in the Accident/Incident Database, which contains five types of data:

- Factual information that documents the accident situation.
- Occurrence codes to document what happened during an accident.
- Phase-of-flight codes to designate when each occurrence took place.
- Explanatory causes, factors, and findings to identify the cause-and-effect relationships that help explain why the accident happened.
- Narrative data that describe the accident in natural language and state the probable cause of the accident.

Factual Information. Investigators enter information in the database that describes the accident aircraft, crew and passengers, and accident environment. These data typically include aircraft type, make and model, aviation-related demography of flight and cabin crew, weather conditions, and accident site details.

Occurrence Data. The circumstances of an accident are documented in the Safety Board's accident report as accident "occurrences" within a "sequence of events." As stated above, occurrence data indicate *what* happened during the accident. A total of 54 occurrence codes[3] are available to describe the events for any given accident. Because aviation accidents are rarely limited to a single event, each accident is coded as a sequence (that is, occurrence 1, occurrence 2, etc.), with as many as five different occurrence codes. For accidents that involve more than one aircraft, the list of occurrences is unique to each aircraft.

[2] The definitions of a "death" (fatality), "serious injury," or "substantial damage" are presented in Appendix B.

[3] Two of the codes, "missing aircraft" and "undetermined," do not represent operational events.

Occurrence data do not include any information about why an accident may have happened; the first occurrence can instead be considered the first observable link in the accident chain of events. First occurrence data are used with phase-of-flight data to characterize the initiating event in an accident sequence.

Phase-of-Flight Data. Investigators use phase-of-flight codes to describe *when* an occurrence takes place in the chronology of flight. These 50 distinct codes are classified into six major categories describing typical flight operations: takeoff or climb, approach or landing, maneuvering or hovering, cruise or descent, standing, and taxiing. Each category contains more specific detail about that phase of flight; for example, the category "standing" includes standing with engines operating, standing with engines not operating, and standing while starting engines.

Findings, Factors, and Probable Cause Data. In addition to coding accident occurrences and phase-of-flight data, the Safety Board determines probable cause. The objective of this determination is to discern the cause-and-effect relationships in the accident sequence. This could be described as *why* the accident happened. In determining probable cause, the Safety Board considers all facts, conditions, and circumstances associated with the accident. Within each accident occurrence, any information that helps explain why that event happened is designated as either a "cause" or "factor." The term "factor" is used to describe situations or circumstances that contribute to the accident cause. In addition are findings that provide additional information of interest to the investigation. The details of probable cause are coded as the combination of all causes, factors, and findings associated with the accident. Just as accidents often include a series of events, several causes and factors can help explain why an accident occurred. For this reason, a single accident report can include multiple cause and factor codes. Hundreds of unique codes are available to document probable cause information. These codes have been grouped into three broad cause/factor categories: aircraft, environment, and personnel.

Narrative Data. Natural language textual descriptions of the accident and accident probable cause are maintained in the database and can be retrieved with other specific information about the accident.

The five types of data can also be related to the factual and analysis components of an accident investigation. The factual information and the narratives describing the accident represent the encoding in the database of the factual components of the investigation. The narrative describing the probable cause, and the occurrence codes, phase-of-flight codes, and causes, factors, and findings, represent the encoding of the analysis.

Shortly after completing the on-scene investigation, investigators submit a preliminary factual report containing limited information about the accident or incident, such as date, location, aircraft operator, and type of aircraft. Once investigators have finished gathering and compiling information, they submit a factual report. After the investigation is complete, a final report is issued, which includes an analysis of the factual information, statement of probable cause and other contributing factors, and, if appropriate, a list of recommendations. For major accident investigations, the probable cause is approved by the five Members of the Safety Board or their designees; for general aviation accident investigations, approval authority may be delegated to the Director of Aviation Safety. Information about the accident and the investigation is available to the public after approval by the Safety Board Members or their designees.

Accident Rate Data: Compiling Aircraft Flight Activity

All Part 121 and scheduled Part 135 carriers are required by regulation to report revenue flight activity[4] data to the Department of Transportation,[5] while on-demand Part 135 carriers are not. As a result, accident data in this review—and the method used to calculate accident rates—differ depending on the type of operation.

Part 121 and scheduled Part 135 flight activity data, including flight hours, number of departures, and miles, are maintained by the Bureau of Transportation Statistics (BTS). These data are aggregated by the FAA's Systems Process Audit staff (AFS-40) to produce annual reports of flight activity. The flight activity measures are based on a full census of the active Part 121 and scheduled Part 135 fleet.

In contrast, flight activity data for on-demand Part 135 operations are estimated using the voluntary *General Aviation and Air Taxi Activity and Avionics* (*GAATAA*) *Survey*, which is compiled annually by the FAA. The *GAATAA Survey* was established in 1978 to gather a sampling of information from owners of general aviation and on-demand Part 135 aircraft. The information includes flight hours, avionics, base location, and use, but does not include miles flown or number of departures. To conduct the survey, the FAA selects registered aircraft from its Civil Aviation Registry using a stratification procedure based on aircraft type and geographic region. Note that the small proportion of on-demand Part 135 aircraft in the survey, combined with low survey response rates, and the fact that the survey goes to aircraft owners rather than operators, results in an imprecise activity estimate.

[4] Activity data include revenue aircraft hours, revenue aircraft departures, revenue aircraft miles flown, and several others.

[5] Part 121 operators report activity monthly using Traffic Reporting System Form 41, Schedules T-100 and T-100(f), and quarterly using Scheduled Part 135 Operators Report, U.S. Bureau of Transportation Statistics (BTS) Form 298-C, Schedules A-1 and T-1.

Once *GAATAA Survey* data are compiled, the FAA estimates flight hours, which the Safety Board includes in its annual reviews. Prior to 2002, the FAA estimated flight hours based strictly on *GAATAA Survey* data. In 2002, the FAA changed its estimating method and revised its flight-hour estimates for on-demand Part 135 operations for 1992–2000. The revised activity estimate uses calculations that are based on the number of aircraft assumed to operate on-demand operations[6] and the average number of flight hours reported on the *GAATAA Survey*. FAA's flight-hour estimates as revised for on-demand Part 135 flight operations are substantially higher than they would have been using the previous method. For example, before the FAA changed its estimating method, the flight-hour estimate for the year 2000 would have been 2,430,000; estimated using the revised method, it is 3,552,881, an estimate that is 46.2% higher. This change in estimated flight activity results in a consistently lower accident rate calculation for the years 1992-2004. The change is so dramatic that the Safety Board maintains on its website[7] a comparison of flight-hour estimates for each year using both estimating methods. This review uses the revised activity measures for on-demand Part 135 operations.

The only flight-activity measure that is common for Part 121, scheduled Part 135, and on-demand Part 135 operations is flight hours. Although the number of departures is available for Part 121 and scheduled Part 135 operations, the flight-hour-per-departure rates for those operations differ greatly. Accordingly, this review calculates accident rates for Part 121 and scheduled Part 135 operations using the number of flight hours and departures. The number of departures or miles flown is not available for on-demand Part 135 operations and cannot therefore be used to calculate rates for those operations.

Prior to the 1998 review, activity rates were presented in units of hundred-thousands for flight hours and departures and in millions for miles flown. Because of an increase in activity and a decrease in accident numbers, and to facilitate interpretation of rate data, this review now presents aircraft activity data in units of millions for flight hours and departures and billions for miles flown; accident rates are calculated using flight hours and number of departures only.[8] Any comparisons with Safety Board data published before the 1998 review should take this change into account.

[6] Data are derived from the FAA's Vital Information Subsystem (VIS), a database used to track commercial aircraft operating certificates.

[7] See table 9a at <http://www.ntsb.gov/aviation/Table9a.htm>.

[8] From U.S. Bureau of Transportation Statistics (BTS), 2004 National Transportation Statistics, Table 2-9 for Part 121 Operations, Table 2-10 for Scheduled Part 135 Operations, and Table 2-13 for On-Demand Part 135 Operations.

Appendix D

Characteristics of the Air Carrier Fleet

The number of major air carriers did not change greatly between 1995 and 2003, ranging from 11 in 1995 to 14 in 2003 (table D1). However, the number of other carriers (including national, large regional, and medium regional) decreased after 1995 from a peak of 85.

Table D1: Number of Air Carriers, 1996 – 2004[1]

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Major Air Carriers	12	13	13	13	15	15	15	14	14
Other Air Carriers	84	83	83	81	76	72	68	66	69
Total	96	96	96	94	91	87	83	80	83

The number of air carrier aircraft in the fleet increased 15% from 1994 to a peak of 8,497 in 2001 (table D2). All of the increase was in turbojets, which increased almost 40% in that period, while the number of turboprop airplanes, piston airplanes, and helicopters declined.

[1] BTS, National Transportation Statistics, Table 1-2 (April 2007). Air carrier groups are categorized based on their annual operating revenues as major, national, large regional, and medium regional. The thresholds were last adjusted July 1, 1999, and the threshold for major air carriers is currently $1 billion. The other air carrier category contains all national, large regional, and medium regional air carriers.

Table D2: Air Carrier Aircraft Characteristics, 1995 – 2004[2]

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fixed Wing	7,293	7,357	7,482	7,994	8,106	8,016	8,370	8,161	8,144	8,150
Turbojet	4,832	4,922	5,108	5,411	5,630	5,956	6,296	6,383	6,523	6,691
Turboprop	1,713	1,696	1,646	1,832	1,788	1,475	1,494	1,250	1,123	984
Piston	748	739	728	751	688	585	580	528	498	475
Helicopter	118	121	134	117	122	39	127	33	32	36

Between 1990 and 2000, air carrier passenger miles increased 49.2%, and the average number of miles flown per aircraft increased 12.8%. Similarly, per-passenger-mile revenues for domestic scheduled air carriers increased steadily over the last two decades, with a record average high of 14.6 cents per mile in 2000.

The number of enplanements is another indicator of the aviation environment. In 2004, 655 million passengers boarded airplanes at U.S. airports. Figure D1 lists the number of enplanements at the top 20 airports in the United States in 2004.[3] As in previous years, Hartsfield Atlanta International Airport had the highest traffic volume with 40.4 million enplanements.

[2] BTS, National Transportation Statistics, Table 1-13 (June 2006).

[3] BTS, National Transportation Statistics, Table 1-41 (December 2006).

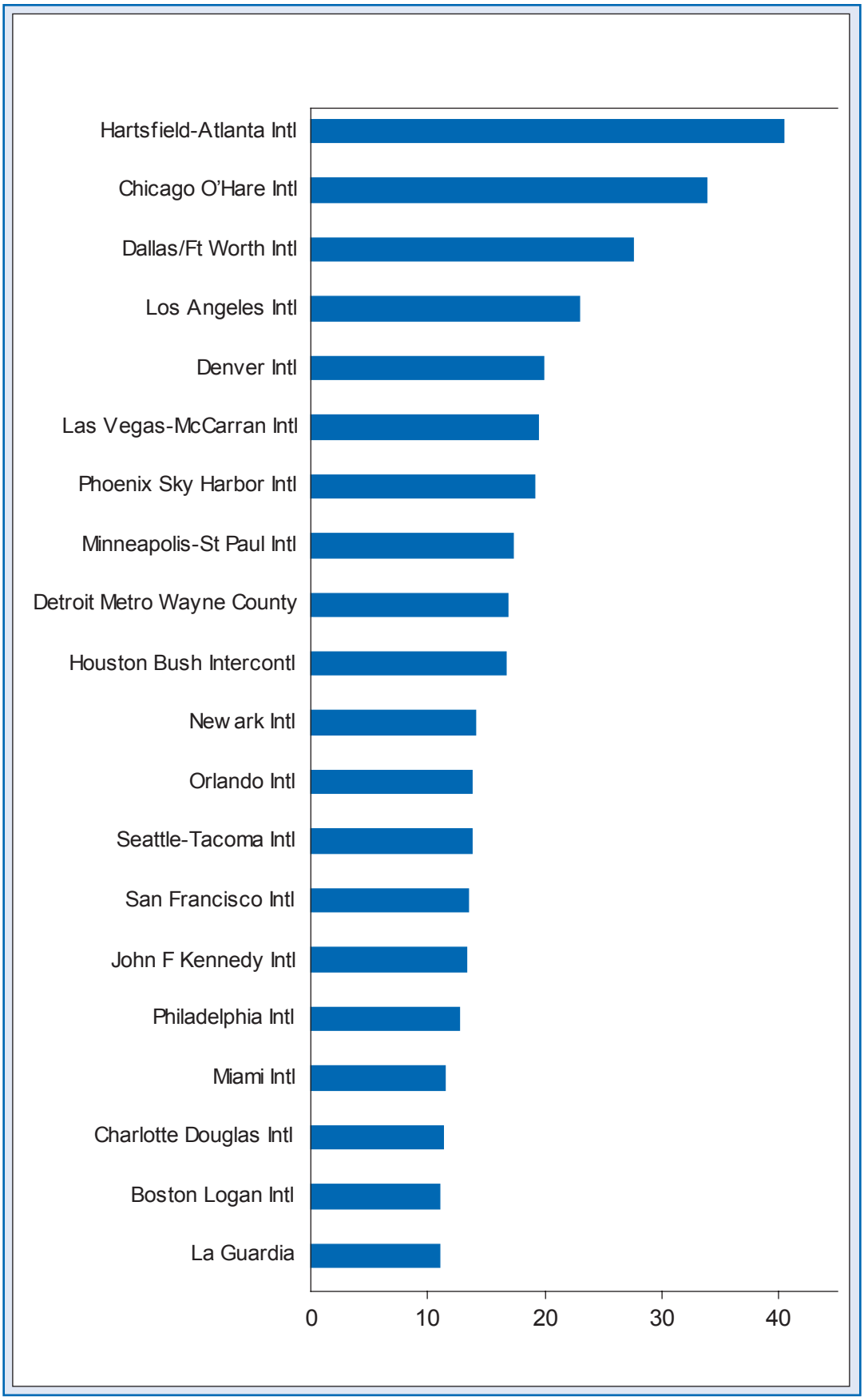


Figure D1. Enplanements (Millions) 2004 Top 20 U.S. Airports FPP

The latest figures for the number of jet transport aircraft shipments show a cyclical pattern in the period 1994 through 2003 (see figure D2); total deliveries to U.S. and foreign customers peaked in 1999.[4] Shipments to U.S. customers peaked in 2001, with shipments in 2002 down 44% from that year. An average of 48% of all shipments went to U.S. customers from 1994 through 2003, with a low of 39% in 1994 and a high of 69% in 2001. The least number of aircraft were shipped in 1995 (256 to all customers), and the most were shipped in 1999. The overall increase in aircraft shipments after 1996 was accompanied by more shipments to U.S. customers and a steady decrease in shipments to foreign customers.

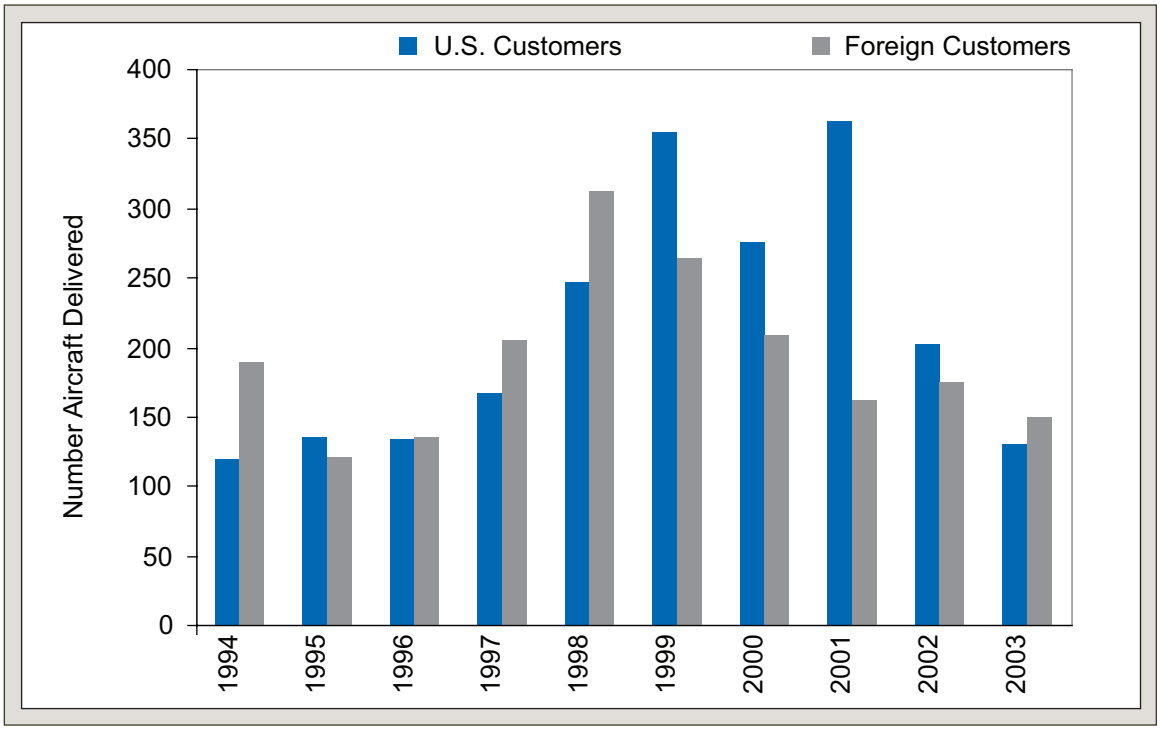


Figure D2. Number of Jet Transport Aircraft Shipments 1994-2003

[4] Includes 707, 737, 747, 757, 767, 777, MD-11, MD-80, MD-90, MD-95, DC-8, DC-9, DC-10, and L-1011. From Aerospace Industries Association Web site www.aia-aerospace.org/stats/aero_stats/aero_stats.cfm. Data are from Series 21, April 18, 2006.

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