

BY RICK DARBY

Absolute Zero

Large U.S. scheduled air carriers and commuter airlines had no fatal accidents in 2011.

For the second year in a row, U.S. Federal Aviation Regulations Part 121 and Part 135 scheduled (commuter) operations resulted in no fatalities, according to preliminary data from the U.S. National Transportation Safety Board (NTSB).¹ Part 135 on-demand (air taxi) flights, however, had the most fatal accidents and fatalities since 2008.

The accident rates for scheduled Part 121 flights and scheduled Part 135 flights favored Part 121 flights. The former had a rate of 0.314 accidents per 100,000 departures, the latter 0.714 accidents per 100,000 departures, or 2.3 times the Part 121 rate (Table 1). The contrast based on rates per 100,000 flight hours was even starker: 0.162 for Part 121

Accidents, Fatalities and Rates, U.S. Civil Aviation, 2011								
	Accidents		Fatalities		Accidents per 100,000 Flight Hours		Accidents per 100,000 Departures	
	All	Fatal	Total	Aboard	All	Fatal	All	Fatal
U.S. air carriers operating under FARs Part 121								
Scheduled	28	0	0	0	0.162	—	0.314	—
Nonscheduled	3	0	0	0	0.637	—	1.987	—
U.S. air carriers operating under FARs Part 135								
Commuter	4	0	0	0	1.303	—	0.714	—
On-Demand	50	16	41	41	1.500	0.480	—	—
U.S. general aviation	1,466	263	444	433	6.510	1.170	—	—
U.S. civil aviation	1,550	279	485	474	—	—	—	—
Non-U.S.-registered aircraft	10	2	4	4	—	—	—	—

FARs = U.S. Federal Aviation Regulations
Notes: All data are preliminary.
 Flight hours and departures are compiled and estimated by the U.S. Federal Aviation Administration (FAA). On-demand Part 135 and general aviation flight hours are estimated by the FAA. Departure information for on-demand Part 135 operations and general aviation is not available. On-demand Part 135 operations encompass charters, air taxis, air tours, or medical services when a patient is aboard.
 Accidents and fatalities in the categories do not necessarily sum to the figures in U.S. civil aviation because of collisions involving aircraft in different categories.
 Source: U.S. National Transportation Safety Board

Table 1

Accidents and Accident Rates, FARs Part 121, by NTSB Classification, 2002–2011

Year	Accidents				Accidents per Million Hours Flown			
	Major	Serious	Injury	Damage	Major	Serious	Injury	Damage
2002	1	1	14	25	0.058	0.058	0.810	1.446
2003	2	3	24	25	0.114	0.172	1.374	1.431
2004	4	0	15	11	0.212	0	0.794	0.583
2005	2	3	11	24	0.103	0.155	0.567	1.238
2006	2	2	7	22	0.104	0.104	0.363	1.142
2007	0	2	14	12	0	0.102	0.713	0.611
2008	4	1	8	15	0.209	0.052	0.419	0.785
2009	2	3	15	10	0.114	0.170	0.852	0.568
2010	1	0	14	14	0.056	0	0.789	0.789
2011	0	0	19	12	0	0	1.070	0.676

FARs = U.S. Federal Aviation Regulations; NTSB = U.S. National Transportation Safety Board

Notes: The NTSB classifications are as follows:

Major — an accident in which any of three conditions is met: A 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 two 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.

Injury — a nonfatal accident with at least one serious injury and without substantial damage to a Part 121 aircraft.

Damage — an accident in which no person was killed or seriously injured, but in which any aircraft was substantially damaged.

Source: U.S. National Transportation Safety Board

Table 2

versus 1.303 for commuter flights, making the commuter rate eight times that for Part 121 air carriers.

Departure information was unavailable for Part 135 on-demand operations, but the rate for all accidents per 100,000 flight hours showed nearly the same discrepancy: 2.4 times the rate of nonscheduled Part 121 operations. The rate for commuters was 1.303, that for on-demand flights was 1.500, 15 percent higher.

The term “accident,” which covers a lot of sins, is an inexact metric for risk management. The NTSB endeavors to be more descriptive by classifying accidents as major, serious, injury or damage in descending order of severity.² Part 121 operations have enjoyed two years in the 2002–2011 decade with no major accidents, and 2011 was one of them (Table 2). On top of that, there were no serious accidents, the next-most significant category, for the second successive year.

The 2011 rate per million flight hours of Part 121 major accidents — zero — compares with an average rate of 0.108 for the 2002–2010 period.³ The rate of serious accidents in the nine years previous to 2011 averaged 0.090, versus zero in 2011. The injury accident rate, 1.070 per million flight hours in 2011, was up from the 0.742 average from 2002 to 2010.

In Part 121 scheduled operations, there were 28 accidents in 2011, one more than in 2010 and less than the average 29.7 for the 2002–2010 stretch

(Table 3). The accident rate per 100,000 departures in 2011, at 0.314, was the highest since 2003 and above the average for the previous nine years, 0.288.

Part 121 nonscheduled operations — cargo flights and some charter flights in transport category airplanes — resulted in three accidents in 2011, none fatal (Table 4). It was the first year since 2006 with no fatal accidents in this industry segment. The number of accidents matched that of 2010, and was less than the 2002–2010 average of 5.2. The 2011 accident rate per 100,000 departures, 1.987, was an increase over 2010’s 1.801.

Part 135 scheduled (commuter) operations had no fatal accidents for the fifth straight year (Table 5, p. 52). There were four accidents in 2011, down from six in 2010; the average for the previous nine years was 4.4. The 2011 rate, 0.714 accidents per 100,000 departures, was a 29 percent improvement on 2010’s 1.011. The average rate for 2002–2010 was 0.800.

Accident Rates, FARs Part 121 Scheduled Operations, 2002–2011

Year	Accidents		Fatalities		Accidents per 100,000 Flight Hours		Accidents per 1,000,000 Miles Flown		Accidents per 100,000 Departures	
	All	Fatal	Total	Aboard	All	Fatal	All	Fatal	All	Fatal
2002	34	0	0	0	0.2030	—	0.0049	—	0.3310	—
2003	51	2	22	21	0.3020	0.0120	0.0073	0.0003	0.4990	0.0200
2004	23	1	13	13	0.1260	0.0050	0.0030	0.0001	0.2130	0.0090
2005	34	3	22	20	0.1820	0.0160	0.0043	0.0004	0.3120	0.0270
2006	26	2	50	49	0.1390	0.0110	0.0033	0.0003	0.2450	0.0190
2007	26	0	0	0	0.1370	—	0.0032	—	0.2420	—
2008	20	0	0	0	0.1080	—	0.0026	—	0.1950	—
2009	26	1	50	49	0.1520	0.0060	0.0036	0.0001	0.2720	0.0100
2010	27	0	0	0	0.1570	—	0.0037	—	0.2850	—
2011	28	0	0	0	0.1620	—	0.0038	—	0.3140	—

FARs = U.S. Federal Aviation Regulations

Notes: 2011 data are preliminary.

Flight hours, miles and departures are compiled by the U.S. Federal Aviation Administration.

Source: U.S. National Transportation Safety Board

Table 3

Accidents, Fatalities and Rates, FARs Part 121, Nonscheduled Operations, 2002–2011

Year	Accidents		Fatalities		Accidents per 100,000 Flight Hours		Accidents per 1,000,000 Miles Flown		Accidents per 100,000 Departures	
	All	Fatal	Total	Aboard	All	Fatal	All	Fatal	All	Fatal
2002	7	0	0	0	1.2250	—	0.0265	—	3.0120	—
2003	3	0	0	0	0.5170	—	0.0113	—	1.4620	—
2004	7	1	1	1	1.0020	0.1430	0.0215	0.0031	2.9150	0.4160
2005	6	0	0	0	0.8850	—	0.0186	—	2.7280	—
2006	7	0	0	0	1.1380	—	0.0243	—	3.6190	—
2007	2	1	1	1	0.3210	0.1610	0.0069	0.0034	1.0300	0.5150
2008	8	2	3	1	1.4640	0.3660	0.0313	0.0078	4.8320	1.2080
2009	4	1	2	2	0.9010	0.2250	0.0184	0.0046	2.8540	0.7130
2010	3	1	2	2	0.5820	0.1940	0.0122	0.0041	1.8010	0.6000
2011	3	0	0	0	0.6370	—	0.0131	—	1.9870	—

FARs = U.S. Federal Aviation Regulations

Notes: 2011 data are preliminary.

Flight hours, miles and departures are compiled by the U.S. Federal Aviation Administration.

Source: U.S. National Transportation Safety Board

Table 4

Two years earlier, in 2009, the number and rate of fatal accidents for Part 135 on-demand (air taxi) operations showed an impressive year-over-year improvement (ASW, 4/10, p. 48). That

now appears to have been a one-off. Numbers and rates of fatal accidents rose in 2010 and 2011 (Table 6, p. 52). In 2011, there were 16 fatal accidents, up from six in 2010. The fatal

Accidents, Fatalities and Rates, FARs Part 135, Commuter Operations, 2002–2011

Year	Accidents		Fatalities		Accidents per 100,000 Flight Hours		Accidents per 1,000,000 Miles Flown		Accidents per 100,000 Departures	
	All	Fatal	Total	Aboard	All	Fatal	All	Fatal	All	Fatal
2002	7	0	0	0	2.5590	—	0.1681	—	1.3630	—
2003	2	1	2	2	0.6270	0.3130	0.0422	0.0211	0.3490	0.1750
2004	4	0	0	0	1.3240	—	0.0855	—	0.7430	—
2005	6	0	0	0	2.0020	—	0.1312	—	1.1380	—
2006	3	1	2	2	0.9950	0.3320	0.0645	0.0215	0.5280	0.1760
2007	3	0	0	0	1.0280	—	0.0651	—	0.5060	—
2008	7	0	0	0	2.3850	—	0.1508	—	1.2150	—
2009	2	0	0	0	0.6480	—	0.0441	—	0.3460	—
2010	6	0	0	0	1.9470	—	0.1264	—	1.0110	—
2011	4	0	0	0	1.3030	—	0.0843	—	0.7140	—

FARs = U.S. Federal Aviation Regulations

Notes: 2011 data are preliminary. Flight hours, miles and departures are compiled by the U.S. Federal Aviation Administration (FAA).

Based on a February 2002 FAA legal interpretation provided to the U.S. National Transportation Safety Board, any Part 135 operation conducted with no revenue passengers aboard is to be considered an on-demand flight.

Source: U.S. National Transportation Safety Board

Table 5

Accidents, Fatalities and Rates, FARs Part 135, On-Demand Operations, 2002–2011

Year	Accidents		Fatalities		Accidents per 100,000 Flight Hours	
	All	Fatal	Total	Aboard	All	Fatal
2002	60	18	35	35	2.06	0.62
2003	73	18	42	40	2.49	0.61
2004	66	23	64	63	2.04	0.71
2005	65	11	18	16	1.70	0.29
2006	52	10	16	16	1.39	0.27
2007	62	14	43	43	1.54	0.35
2008	58	20	69	69	1.81	0.62
2009	47	2	17	14	1.62	0.07
2010	31	6	17	17	1.00	0.19
2011	50	16	41	41	1.50	0.48

FARs = U.S. Federal Aviation Regulations

Notes: 2011 data are preliminary.

Flight hours are estimated by the U.S. Federal Aviation Administration (FAA).

In 2002, the FAA changed its estimate of on-demand activity. The revision was retroactively applied to the years 1992 to 2002. In 2003, the FAA again revised flight activity estimates for 1999 to 2002.

On-demand Part 135 operations comprise charters, air taxis, air tours or medical services when a patient is aboard.

Source: U.S. National Transportation Safety Board

Table 6

accident rate per 100,000 flight hours was 0.48, compared with 0.19 in 2010. The rate for all accidents per 100,000 flight hours rose from 1.00 in 2010 to 1.50 in 2011. ↻

Notes

1. <www.nts.gov/data/aviation_stats_2012.html>.
2. The NTSB classifications are as follows:

Major — an accident in which any of three conditions is met: A 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 two 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.

Injury — a nonfatal accident with at least one serious injury and without substantial damage to a Part 121 aircraft.

Damage — an accident in which no person was killed or seriously injured, but in which any aircraft was substantially damaged.

3. All averages in this article are means.