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Fewer Runway Excursions in 2009

Fatal accident rate for 2000–2009 also shows improvement.

The 2009 picture of fatal accidents in worldwide commercial aviation showed no overall improvement from 2008, but in one important category, there was good news. Runway excursion accidents — targeted by the Flight Safety Foundation Runway Safety Initiative and the *Runway Excursion Risk Reduction Toolkit* — were fewer, according to newly

released data from Boeing Commercial Airplanes.¹

Twelve of the 62 total accidents, or 19 percent, were overruns or veer-offs, both classified as runway excursions (Table 1).² Of the 53 accidents in 2008, 16 — 30 percent — were runway excursions. In 2007, the Boeing data included 10 excursions, 26 percent of the 38 total accidents.

One of the 2009 excursion accidents involved fatalities, compared with three in 2008. Some of the latest excursions involved equipment failures rather than faulty takeoffs or approaches. One excursion resulted from the inability to fully extend the left main landing gear; another, right main landing gear failure and collapse; a third, engine thrust-reverser failure and uncoordinated thrust.

2009 Airplane Accidents, Worldwide Jet Fleet

Date	Airline	Model	Accident Location	Phase of Flight	Description	Damage Category	Onboard Fatalities (External Fatalities)	Major Accident?
Jan. 6	China Southern Airlines	777-200	Pacific Ocean	Cruise	Flight attendant broken ankle			
Jan. 15	US Airways	A320	New Jersey, U.S.	Climb	Multiple bird strikes, ditching	Destroyed		●
Jan. 17	Iran Air	F-100	Yazd, Iran	Parked	Fuselage struck by ambulift	Substantial		
Jan. 19	Iran Air	F-100	Tehran, Iran	Landing	Veered off runway	Substantial		
Feb. 9	Air Méditerranée	A321	Paris	Landing	Overshot runway turnoff	Substantial		
Feb. 13	BA CityFlyer	RJ-100	London	Landing	Nose landing gear collapse	Substantial		
Feb. 16	Air Algérie	737-400	In Aménas, Algeria	Landing	Overran runway	Substantial		
Feb. 19	Atlasjet Airlines	A320	Istanbul, Turkey	Tow	Towbar failure			
Feb. 23	Royal Air Maroc	737-800	Medina, Saudi Arabia	Takeoff	Tail strike	Substantial		
Feb. 23	Lion Air	MD-90	Batam, Indonesia	Landing	Gear-up landing	Substantial		
Feb. 25	Turkish Airlines	737-800	Amsterdam, Netherlands	Landing	Crash during approach	Destroyed	9 (0)	●
March 2	CityJet	RJ-85	Dublin, Ireland	Tow	Aircraft struck tug	Substantial		
March 9	Lion Air	MD-90	Jakarta, Indonesia	Landing	Veer-off	Destroyed		●
March 20	Emirates	A340	Melbourne, Australia	Takeoff	Tail strike	Substantial		
March 23	FedEx	MD-11	Tokyo	Landing	Hard landing	Destroyed	2 (0)	●
April 4	Air China	A321	Beijing	Landing	Tail strike	Substantial		
April 9	Aviastar Mandiri	BAe 146	Wamena, Indonesia	Approach	Struck hill	Destroyed	6 (0)	●
April 12	Wizz Air	A320	Timisoara, Romania	Landing	Hard landing	Substantial		
April 16	Jade Cargo International	747-400	Incheon, South Korea	Landing	Veer-off	Substantial		
April 20	Royal Air Maroc	767-300	New York	Landing	Hard landing	Substantial		
April 27	Magnicharters	737-200	Guadalajara, Mexico	Landing	Gear-up landing	Substantial		

Table 1

(continued next page)

2009 Airplane Accidents, Worldwide Jet Fleet

Date	Airline	Model	Accident Location	Phase of Flight	Description	Damage Category	Onboard Fatalities (External Fatalities)	Major Accident?
April 29	Bako Air	737-200	Massamba, DR Congo	Cruise	Crashed en route	Destroyed	7 (0)	●
May 4	Northwest Airlines	A320	Denver	Landing	Tail strike	Substantial		
May 6	World Airways	DC-10	Baltimore	Landing	Hard landing	Substantial		
May 7	NAS Air	A320	Alexandria, Egypt	Landing	Hard landing	Substantial		
May 8	Saudi Arabian Airlines	MD-90	Riyadh, Saudi Arabia	Taxi	Veer-off	Substantial		
May 8	Asiana Airlines	747-400	Frankfurt, Germany	Approach	Flap departed, punctured fuselage	Substantial		
May 19	American Airlines	777-200	Miami	Parked	Employee fall		(1)	
June 1	Air France	A330	Atlantic Ocean	Cruise	Crashed into Atlantic Ocean	Destroyed	228 (0)	●
June 3	China Cargo	MD-11	Urumqi, China	Landing	Hard landing	Substantial		
June 3	Aeroflot-Nord	737-500	Moscow	Cruise	Heavy hail encounter	Substantial		
6 June	Myanma Airways	F-28	Akyab, Myanmar	Landing	Departed runway	Destroyed		●
June 8	United Airlines	777-200	Pacific Ocean	Cruise	Flight attendant broke ankle			
June 9	Saudi Arabian Airlines	MD-11	Khartoum, Sudan	Landing	Hard landing	Substantial		
June 27	US Airways	737-400	Tampa, Florida, U.S.	Landing	Hard landing	Substantial		
June 30	Yemenia	A310	Indian Ocean	Approach	Crashed into Indian Ocean	Destroyed	152 (0)	●
July 7	Rossiya Russian Airlines	A320	St. Petersburg, Russia	Landing	Tail strike	Substantial		
July 17	Transaero Airlines	737-400	Moscow	Landing	Tail strike	Substantial		
July 21	Aeromexico	737-700	San Francisco	Tow	Landing gear collapse	Substantial		
Aug. 3	Saha Air	707-300	Ahwaz, Iran	Initial Climb	Uncontained engine failure	Substantial		
Aug. 4	Sata Internacional	A320	Ponta Delgada, Portugal	Landing	Hard landing	Substantial		
Aug. 10	All Nippon Airways	737-800	Tokyo	Landing	Tail strike	Substantial		
Sept. 4	Air India	747-400	Mumbai	Taxi	Fuel leak, fire	Substantial		
Sept. 13	Lufthansa Cargo	MD-11	Mexico City	Landing	Hard landing	Substantial		
Sept. 14	Contact Air Flugdienst	F-100	Stuttgart, Germany	Landing	Gear-up landing	Substantial		
1 Oct.	Wind Jet	A319	Catania, Italy	Cruise	Turbulence, hail	Substantial		
Oct. 2	Malaysia Airlines	737-400	Kuching, Malaysia	Tow	Landing gear collapse	Substantial		
Oct. 6	Boliviana de Aviación	737-300	Cochabamba, Bolivia	Cruise	Hail encounter	Substantial		
Oct. 20	Centurion Air Cargo	MD-11	Montevideo, Uruguay	Landing	Hard landing	Substantial		
Oct. 21	Sudan Airways	707-300	Sharjah, United Arab Emirates	Initial Climb	Struck terrain	Destroyed	6 (0)	●
Oct. 30	Pegasus Airlines	737-800	Malatya, Turkey	Taxi	Wing stuck light pole	Substantial		
Nov. 2	Delta Air Lines	MD-90	Phoenix	Climb	Bird strike	Substantial		
Nov. 18	Iran Air	F-100	Isfahan, Iran	Landing	Landing gear collapse	Substantial		
Nov. 19	Compagnie Africaine d'Aviation	MD-82	Goma, DR Congo	Landing	Overrun	Destroyed		●
Nov. 28	Avient Aviation	MD-11	Shanghai	Takeoff	Overrun	Destroyed	3 (0)	●
Dec. 1	TAF Linhas Aéreas	727-200	São Paulo	Taxi	Struck maintenance stand	Substantial		
Dec. 2	Merpati Nusantara Airlines	F-100	Kupang, Indonesia	Landing	Veer-off	Substantial		
Dec. 17	TAF Linhas Aéreas	727-200	Manaus, Brazil	Approach	Wind shear	Substantial		
Dec. 21	Merpati Nusantara Airlines	737-300	Makassar, Indonesia	Landing	Hard landing	Substantial		
Dec. 21	Canadian North	737-200	Calgary, Canada	Parked	De-icer fall		(1)	
Dec. 22	American Airlines	737-800	Kingston, Jamaica	Landing	Overrun	Destroyed		●
Dec. 29	Wizz Air	A320	Boryspil, Ukraine	Landing	Veer-off	Substantial		
Total accidents (62)							413 (2)	13

Source: Boeing Commercial Airplanes

Table 1

Four of the 2009 excursions, one-third, were classified as major accidents, a category that partially overlaps with the fatal accident category.³ Six of the excursions in 2008 — 38 percent — were major accidents.

The 37 approach and landing accidents (ALAs) accounted for 60 percent of the 2009 total, compared with 31 — 58 percent — in 2008 and 23 — 61 percent — in 2007. Although ALAs as a percentage of the total number of accidents have not changed by more than three percentage points in the past three years, their consequences were less severe in 2009. Four of the ALAs in 2009, or 11 percent, involved fatalities. The corresponding percentages for 2008 and 2007 were 19 percent and 22 percent, respectively.

Most of Boeing’s data in its annual accident summaries concern the most recent year plus the previous nine years, thus offering a chance to compare successive 10-year periods. For example, the 2008 report included 1999 through 2008 numbers; the 2009 report comprises 2000 through 2009 (Table 2).

In 2000–2009, the fatal accident rate for scheduled commercial passenger operations was 0.42 per million departures, compared with 0.45 in 1999–2008 and 0.50 in 1998–2007.

The 10-year period beginning in 2000 included 301 accidents in passenger operations, a 6 percent increase over the 283 in 1999–2008 and a 5 percent increase above the 286 in the 1998–2007 stretch. The increases in the latest 10 years included both scheduled operations and charter flights, 6 percent and 17 percent respectively. Accidents in cargo operations increased in the most recent period from 79 to 81, or by 3 percent.

Fatal accidents in 2000–2009 numbered 72, 5 percent fewer than the 76 in the previous period and 8 percent fewer than in the 78 in 1998–2007. The

Accidents, Worldwide Commercial Jet Fleet, by Type of Operation						
Type of operation	All Accidents		Fatal Accidents		On-board Fatalities (External Fatalities)*	
	1959–2009	2000–2009	1959–2009	2000–2009	1959–2009	2000–2009
Passenger	1,344	301	475	72	27,833 (778)	4,942 (171)
Scheduled	1,235	280	430	69	23,719	4,938
Charter	109	21	45	3	4,114	4
Cargo	224	81	73	14	255 (329)	42 (73)
Maintenance test, ferry, positioning, training and demonstration	116	11	44	3	208 (66)	17 (0)
Totals	1,704	393	592	89	28,296 (1,173)	5,001 (244)
U.S. and Canadian operators	530	77	176	14	6,153 (381)	355 (15)
Rest of the world	1,174	316	416	75	22,143 (792)	4,646 (229)
Totals	1,704	393	592	89	28,296 (1,173)	5,001 (244)

*External fatalities include ground fatalities and fatalities on other aircraft involved, such as helicopters or small general aviation airplanes, that are excluded.

Source: Boeing Commercial Airplanes

Table 2

69 fatal accidents in scheduled service compared with 74 in the previous period, a 7 percent improvement. The number of fatal charter accidents held steady at three.

There were 4,942 on-board fatalities from 2000 to 2009, compared with 4,670 from 1999 to 2008, a 6 percent difference. That included an increase in fatalities during scheduled operations from 4,666 to 4,938. There were four fatalities in charter operations in both periods.

Among all the accidents in 2000–2009, 23 percent involved fatalities (Figure 1). The corresponding ratio for 1999–2008 and 1998–2007 was 25 percent. The fatal-accident proportion from 1959–2009, comprising most of the years of passenger-jet service, was 35 percent.

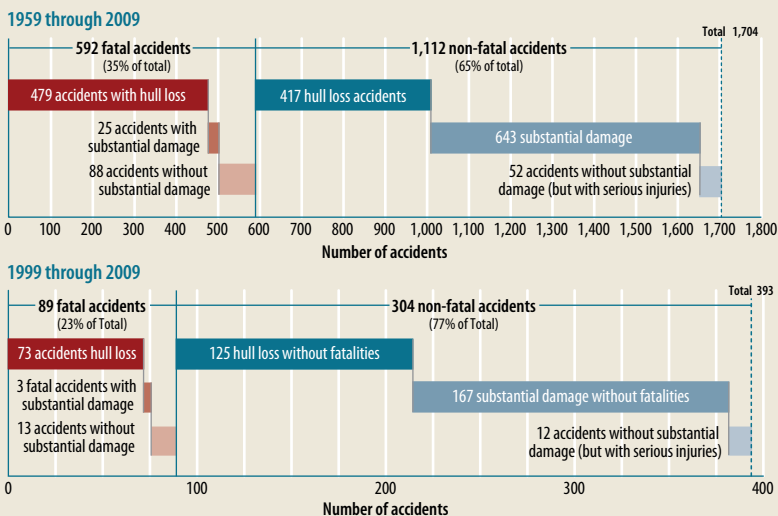
Among the 304 nonfatal accidents in the latest 10-year period, 292 — 96 percent — involved either hull loss or substantial damage.⁴ A smaller proportion — 85 percent — of fatal accidents involved hull loss or substantial damage. The comparable numbers

for 1999–2008 were 97 percent and 86 percent, respectively.

Boeing tabulated fatalities according to the U.S. Commercial Aviation Safety Team/International Civil Aviation Organization (CAST/ICAO) standard taxonomy (Figure 2).⁵ “Loss of control in flight” (LOC-I) and “controlled flight into terrain” (CFIT) continued to be involved in the greatest number of fatalities in the most recent 10 years. However, loss of control on-board fatalities were 1.8 to 2.0 times higher than CFIT fatalities in the most recent 10-year periods. In 2000–2009, there were 1,759 LOC-I on-board fatalities and 961 CFIT fatalities. For 1999–2008, the numbers were 1,926 and 961, respectively; for 1998–2007, 1,984 and 1,137 respectively.

The combined category “runway excursion — landing” plus “abnormal runway contact” plus “undershoot/overshoot” resulted in 606 on-board fatalities in the 2000–2009 period, an increase of 49 percent over the 408 in 1999–2008. In the “system component failure — non-powerplant” category, the latest

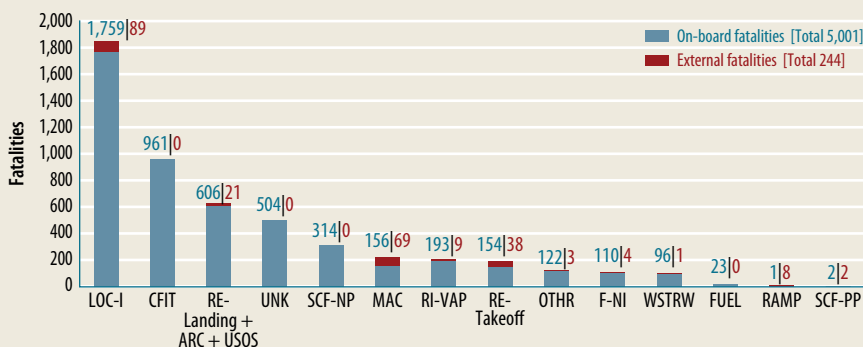
Accidents, by Injury and Damage, Worldwide Commercial Jet Fleet



Note: Airplanes manufactured in the Commonwealth of Independent States or the Soviet Union are excluded because of lack of operational data. Commercial airplanes used in military service are also excluded.
Source: Boeing Commercial Airplanes

Figure 1

Fatalities by CAST/ICAO Taxonomy Accident Category, Worldwide Commercial Jet Fleet, 2000–2009



Number of fatal accidents (89 total) → 20 16 16 4 3 2 3 5 4 2 1 1 9 3

CAST = U.S. Commercial Aviation Safety Team; ICAO = International Civil Aviation Organization; ARC = abnormal runway contact; CFIT = controlled flight into terrain; F-NI = fire/smoke (non-impact); FUEL = fuel related; LOC-I = loss of control – in flight; MAC = midair/near midair collision; OTHR = other; RAMP = ground handling; RE = runway excursion; RI-VAP = runway incursion – vehicle, aircraft or person; SCF-NP = system/component failure or malfunction (non-powerplant); SCF-PP = system/component failure or malfunction (powerplant); UNK = unknown or undetermined; USOS = undershoot/overshoot; WSTRW = wind shear or thunderstorm.

No accidents were noted in the following principal categories: aerodrome, abrupt maneuver, air traffic management/communications, navigation, surveillance, cabin safety events, evacuation, fire/smoke (post-impact), ground collision, icing, low altitude operations, runway incursion – animal, security related or turbulence encounter.

Note: Principal categories are as assigned by CAST. Airplanes manufactured in the Russian Federation or the Soviet Union are excluded because of lack of operational data. Commercial airplanes used in military service are also excluded.

Source: Boeing Commercial Airplanes

Figure 2

10-year period had 314 on-board fatalities, or 26 percent fewer than the 426 in the previous 10-year period. There was a surge of “unknown or undetermined” accident on-board fatalities, from 120 in 1999–2008 to 504 in 2000–2009.

Notes

1. Boeing Commercial Airplanes. *Statistical Summary of Airplane Accidents: Worldwide Operations, 1959–2009*. Available via the Internet at <www.boeing.com/news/techissues>.
2. The data are limited to commercial jet airplanes over 60,000 lb (27,216 kg) maximum gross weight. Airplanes manufactured in the Soviet Union or Commonwealth of Independent States are excluded because of the lack of operational data.

An airplane *accident* is defined as “an occurrence associated with the operation of an airplane that takes place between the time any person boards the airplane with the intention of flight and such time as all such persons have disembarked, in which death or serious injury results from being in the airplane; direct contact with the airplane or anything attached thereto; or direct exposure to jet blast; the airplane sustains substantial damage; or the airplane is missing or completely inaccessible.” Occurrences involving test flights or resulting from hostile action such as sabotage or hijacking are excluded.
3. Boeing defines a *major accident* as one in which any of three conditions is met: the airplane was destroyed; there were multiple fatalities; or there was one fatality and the airplane was substantially damaged. Flight Safety Foundation supports the use of this term to designate the most severe accident category in preference to the traditional term *hull loss*, which the Foundation believes is more significant for insurance actuarial purposes than as a measure of risk.
4. *Substantial damage* is “damage or failure which adversely affects the structural strength, performance or flight characteristics of the airplane, and which would normally require major repair or replacement of the affected component.”
5. The taxonomy is described at <www.intlaviationstandards.org>.