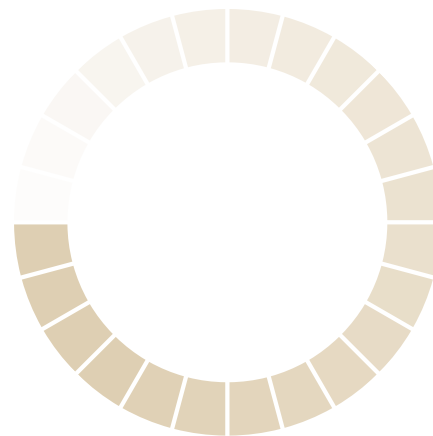


BY RICK DARBY

# Progress Report

The accident statistics for 2011 offer encouraging signs.



If there can be such a thing as a good year for accidents, 2011 was that year in worldwide commercial jet aviation.

The 2011 record showed reductions in two of the most serious accident types, runway excursions and approach and landing accidents. Runway excursions — veer-offs and overruns — occurred in 25 percent of the 36 accidents last year, compared with 33 percent of the 40 accidents in 2010. Approach and landing accidents represented 58 percent of the total in 2011, versus 65 percent the previous year.

Absolute numbers of these types of accidents were lower as well: nine overruns in 2011, 13 in 2010; 21 approach and landing accidents in 2011, 26 in 2010. The data are derived from Boeing Commercial Airplanes' annual statistical summary.<sup>1,2</sup> Airplanes manufactured in the Soviet Union or the Commonwealth of Independent States are excluded for lack of operational data.

Total accident numbers have been declining, down from 62 in 2009

(Table 1, p. 50). On-board fatalities have dropped as well: 175 last year, compared with 555 in 2010 and 413 in 2009. Fluctuations in annual fatality numbers, however, are partially influenced by chance — an accident involving the same basic aircraft type might kill two people, the pilots, on a cargo flight and several hundred on a passenger flight. One 2011 fatal crash, in fact, did involve a scheduled cargo-carrying Boeing 747-400 that crashed into the sea while the flight crew was diverting because of an on-board fire, with the loss of the two pilots, the only crewmembers.

Four of the 36 accidents in 2011 (11 percent) involved at least one on-board fatality, versus eight of 40 in 2010 (20 percent) and nine of 62 (15 percent) in 2009. Seven of the 2011 accidents (19 percent) were major accidents, according to U.S. National Transportation Safety Board terminology.<sup>3</sup> Comparable percentages were 28 percent in 2010 and 21 percent in 2009.

In its accident data, Boeing emphasizes time frames longer than a year.

Fatal accidents in passenger operations during the 10-year period 2002–2011 numbered 63 (Table 2, p. 51). The comparable number for 2001–2010 was 69. On-board fatalities in passenger operations in the most recent 10-year period totaled 4,486; in the previous 10 years, 4,711.

In scheduled passenger service, there were 60 fatal accidents in 2002–2011, compared with 67 in 2001–2010. However, all accidents in passenger operations increased from 308 to 317 in the most recent 10-year period. Accidents in cargo operations decreased from 80 to 74 in the most recent period.

The fatal accident rate in 2002 through 2011 for scheduled commercial passenger operations was 0.34 per million departures, and 0.62 for other types of operations, including chartered passenger, scheduled cargo, chartered cargo and maintenance testing. The equivalent rates for 2001–2010 were 0.40 and 0.67, respectively, for improvements of 15 percent and 7 percent.

The 79 fatal accidents from 2002 through 2011 represented 20 percent

## 2011 Airplane Accidents, Worldwide Jet Fleet

Event Date	Airline	Model	Accident Location	Phase of Flight	Description	Damage Category	On-board Fatalities/ Occupants (External Fatalities)	Major Accident?
Jan. 3	American Airlines	737-800	Los Angeles	Takeoff	Tail strike	Substantial		
Jan. 9	Iran Air	727	(Near) Urumiyeh, Iran	Final approach	Missed approach at night	Destroyed	78/105 (0)	●
Jan. 10	AirAsia	A320	Kuching, Malaysia	Landing	Runway veer-off	Substantial		
Jan. 10	Africa Charter Airline	737-200	Hoedspruit, South Africa	Taxi	Rolled off the side of a taxiway	Substantial		
Jan. 13	American Airlines	757	Los Angeles	Takeoff	Tail strike	Substantial		
Feb. 16	Saudi Arabian Airlines	747-300	Madinah, Saudi Arabia	Landing	Runway veer-off	Substantial		
Feb. 24	US Airways	ERJ-190	New York	Landing	Galley cart struck a passenger's ankle			
March 27	Hapag-Lloyd Flug	737-800	Tenerife, Spain	Takeoff	Tail strike	Substantial		
March 30	Northern Air Cargo	737-300	Dayton, Ohio, U.S.	Initial climb	Pallet jack in the cargo hold fractured a structural frame	Substantial		
April 11	Comair	CRJ-700	New York	Taxi	Vertical stabilizer struck by a taxiing aircraft	Substantial		
April 13	Air France	A330	Caracas, Venezuela	Landing	Hard landing	Substantial		
April 17	China Cargo	777	Copenhagen, Denmark	Landing	Tail strike	Substantial		
May 6	Continental Airlines	737-800	Greenville, Mississippi, U.S.	Taxi	Taxiway tarmac collapsed under landing gear	Substantial		
May 18	Omega Air	707	Point Mugu, California, U.S.	Initial climb	Engine and pylon separated from the wing; veer-off	Destroyed		●
May 28	SBA Airlines	767	Caracas, Venezuela	Landing	Hard landing	Substantial		
June 25	Malev Hungarian Airlines	737-800	Heraklion, Greece	Landing	Tail strike	Substantial		
July 8	Hewa Bora Airways	727	Kisangani, Congo DR	Final approach	Crashed short of the runway on final approach	Destroyed	83/118 (0)	●
July 14	Delta Connection	CRJ-900	Boston	Taxi	Taxiway collision	Substantial		
July 28	Asiana Airlines	747-400	East China Sea near Jeju Island, South Korea	Cruise	Cargo fire	Destroyed	2/2 (0)	●
July 29	EgyptAir	777	Cairo	Load/unload	Smoke and fire on the flight deck	Substantial		
July 30	Caribbean Airlines Limited	737-800	Georgetown, Guyana	Landing	Runway overrun	Destroyed		●
Aug. 20	First Air	737-200	Resolute Bay, Canada	Final approach	Struck hill and broke apart	Destroyed	12/15 (0)	●
Aug. 29	Gulf Air	A320	Cochin, India	Landing	Runway veer-off	Substantial		
Sept. 2	Turkish Airlines	A340	Mumbai, India	Landing	Runway veer-off	Substantial		
Sept. 3	Mahan Air	A300-600	Mashad, Iran	Landing	Runway veer-off	Substantial		
Sept. 16	TAME	EMB-190	Quito, Ecuador	Landing	Runway overrun	Destroyed		●
Sept. 26	Aerpostal	DC-9	Puerto Ordaz, Venezuela	Landing	Hard landing	Substantial		
Oct. 7	Delta Air Lines	MD-88	Atlanta	Tow	Collision with tug	Substantial		
Oct. 10	Sky Airlines	737-400	Antalya, Turkey	Landing	No flaps, landing gear collapse	Substantial		
Oct. 18	Iran Air	727	Tehran, Iran	Landing	Gear-up landing	Substantial		
Nov. 1	LOT Polish Airlines	767	Warsaw	Landing	Gear-up landing	Substantial		
Nov. 10	SA-Airlink	RJ-85	Johannesburg, South Africa	Landing	Gear-up landing	Substantial		
Dec. 14	Air Canada	A321	Fort Lauderdale, Florida, U.S.	Taxi	Stopped abruptly during taxi because of potential collision			
Dec. 20	Sriwijaya Air	737-300	Yogyakarta, Indonesia	Landing	Landing overrun	Substantial		
Dec. 23	Austrian Airlines	A321	Manchester, England	Go-around	Wind shear and tail strike	Substantial		
Dec. 25	AMC Airlines	MD-83	Karachi, Pakistan	Landing	Nose landing gear up	Substantial		
<b>Total accidents: 36</b>						<b>Totals:</b>	<b>175 (0)</b>	<b>7</b>

Source: Boeing Commercial Airplanes

Table 1

### Accidents, Worldwide Commercial Jet Fleet, by Type of Operation

Type of operation	All Accidents		Fatal Accidents		On-board Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959–2011	2002–2011	1959–2011	2002–2011	1959–2011	2002–2011	1959–2011	2002–2011
Passenger	1,424	317	483	63	28,553 (777)	4,486 (142)	680	129
Scheduled	1,307	294	437	60	24,427	4,470	611	122
Charter	117	23	46	3	4,126	16	69	7
Cargo	252	74	76	13	264 (330)	44 (72)	169	44
Maintenance test, ferry, positioning, training and demonstration	122	13	44	3	208 (66)	17 (0)	74	8
<b>Totals</b>	<b>1,798</b>	<b>404</b>	<b>603</b>	<b>79</b>	<b>29,025 (1,173)</b>	<b>4,547 (214)</b>	<b>923</b>	<b>181</b>
U.S. and Canadian operators	555	78	180	11	6,193 (381)	17 (8)	222	26
Rest of the world	1,243	326	423	68	22,832 (792)	4,530 (206)	701	155
<b>Totals</b>	<b>1,798</b>	<b>404</b>	<b>603</b>	<b>79</b>	<b>29,025 (1,173)</b>	<b>4,547 (214)</b>	<b>923</b>	<b>181</b>

\*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

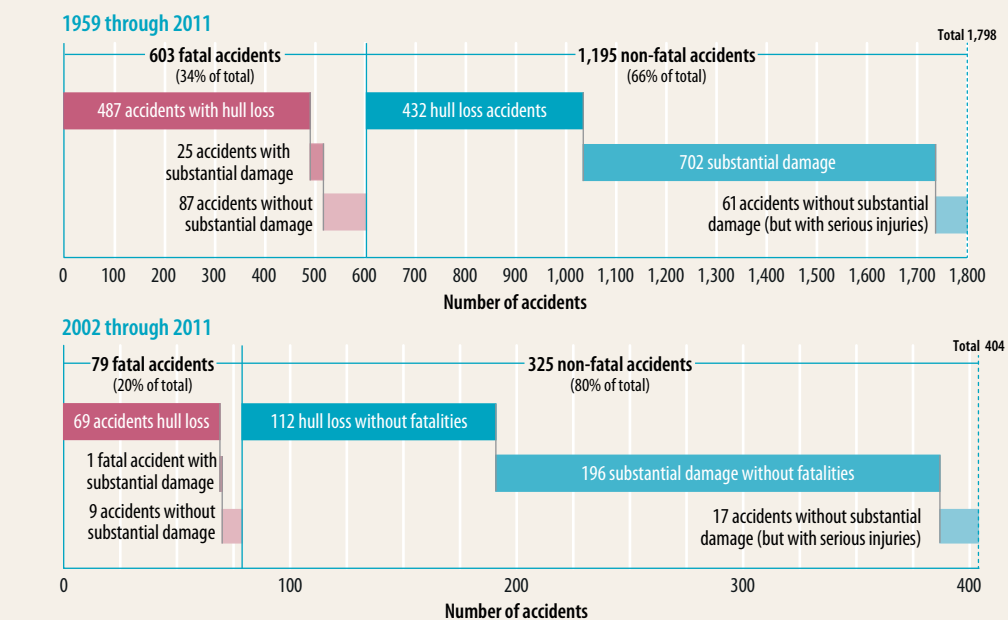
Table 2

of the total accidents (Figure 1). The 87 fatal accidents from 2001 through 2010 were slightly more of the total, at 22 percent. A more striking difference can be seen in comparing the latest 10-year period with the 53-year period that began in 1959, around the beginning of commercial jet aviation. In that span, fatal accidents were 34 percent of the total.

Ideally, design improvements should result in a larger percentage of substantial damage accidents without fatalities.

Little change is evident, however. From 2002 through 2011, the rate was 60 percent; from 1959 through 2011, it was 59 percent. The total period includes recent years, so a comparison of the most recent decades with the most distant might tell a different story.

### Accidents, by Injury and Damage, Worldwide Commercial Jet Fleet



Source: Boeing Commercial Airplanes

Figure 1

Boeing examined fatal accidents using the standardized taxonomy of the U.S. Commercial Aviation Safety Team/International Civil Aviation Organization (CAST/ICAO).<sup>4</sup> For some 10-year periods, “loss of control–in flight” (LOC-I) has resulted in the most fatalities (Figure 2, p. 52). In the 2002–2011 period, LOC-I

fatalities as a percentage of all fatalities were reduced. Among on-board fatalities, 1,493 of a total 4,547, or 33 percent, were in the LOC-I category. In 2001–2010, it had been 1,765 of 4,774, or 37 percent.

The number of fatal LOC-I accidents, 18, was reduced in the most recent period from the previous 20.

Controlled flight into terrain (CFIT) claimed a higher percentage of lives among the total in 2002–2011, 24 percent, compared with 21 percent in the previous 10-year stretch. There was one more CFIT accident in 2002–2011 than in 2001–2010.

Otherwise, there was little change in percentages of on-board fatalities associated with CAST/ICAO categories between the two periods.

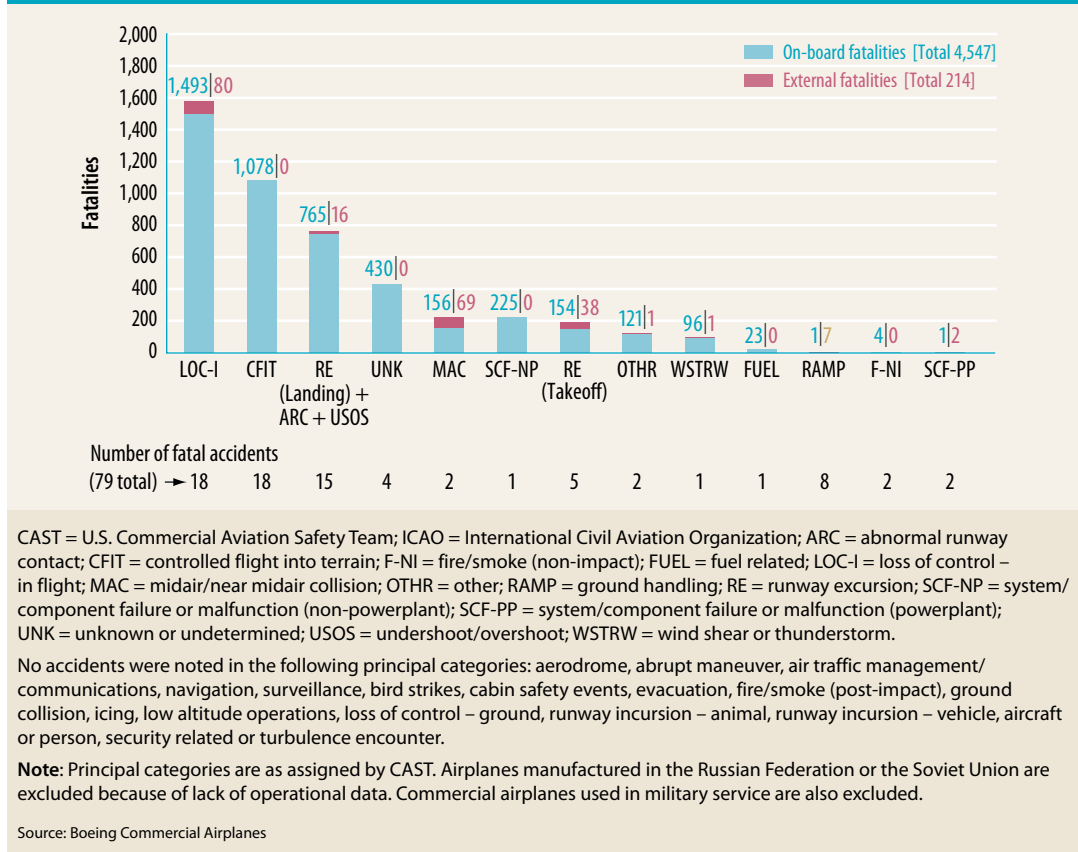
Boeing combines the RE category (runway excursion [landing]) with ARC (abnormal runway contact) and USOS (undershoot/overshoot) in the third-greatest source of on-board fatalities. That was involved in 17 percent of fatalities, similar to the previous period's 16 percent.

Runway excursions on takeoff (RE [take-off]) accounted for 154 on-board fatalities in 2002–2011, 3 percent of the total. That matched the percentage for 2001–2010. ➔

**Notes**

1. Boeing Commercial Airplanes. *Statistical Summary of Commercial Jet Airplane Accidents: Worldwide*

**Fatalities by CAST/ICAO Taxonomy Accident Category, Worldwide Commercial Jet Fleet, 2001–2010**



**Figure 2**

*Operations 1959–2011.* <[www.boeing.com/news/techissues/pdf/statsum.pdf](http://www.boeing.com/news/techissues/pdf/statsum.pdf)>.

2. The data are limited to commercial jet airplanes over 60,000 lb (27,216 kg) maximum gross weight.
3. 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 hostile action such as sabotage or hijacking are excluded.
4. A major accident is defined as one meeting any of three conditions: the airplane was destroyed; there were multiple fatalities; or there was one fatality and the airplane was substantially damaged.
5. <[www.intlaviationstandards.org](http://www.intlaviationstandards.org)>.