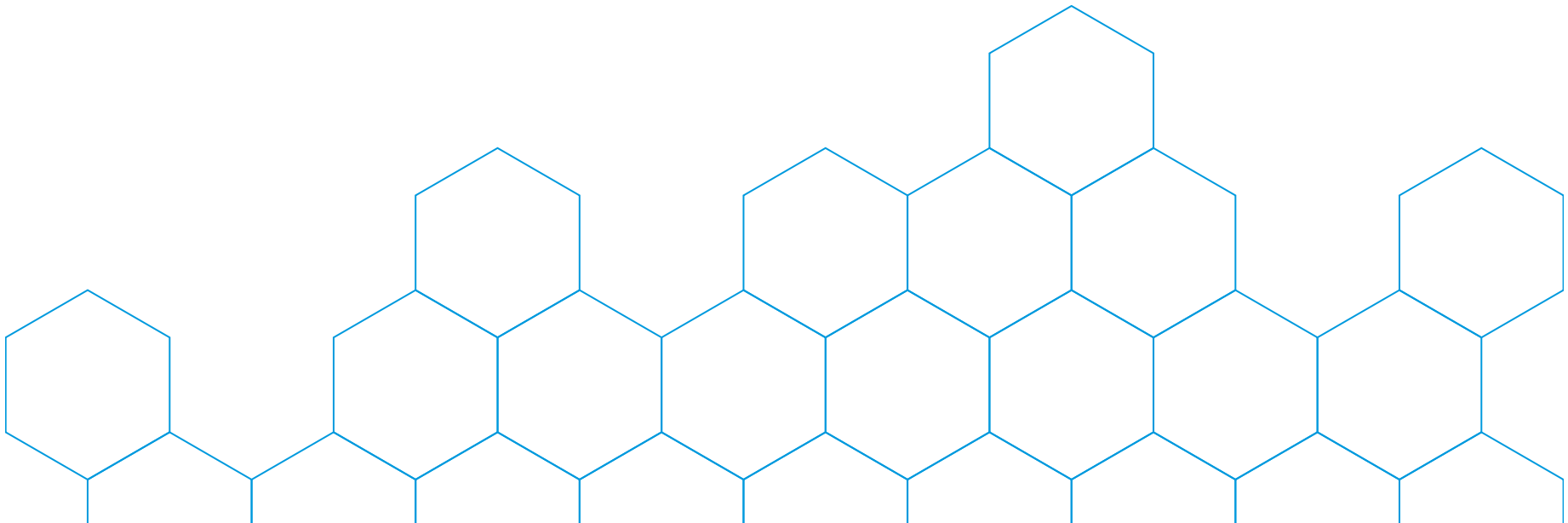
STATISTICAL SUMMARY OF COMMERCIAL JET AIRPLANE ACCIDENTS

Worldwide Operations | 1959 – 2020



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Aviation safety is a journey of continuous improvement.

In this report, we look back through the lens of data—as we've done every year since 1969. There is no denying the challenges of the past year caused by a global health emergency that deeply affected all of us. The COVID-19 pandemic upended the aviation industry and worldwide air travel.

Yet Boeing's commitment to safety never wavered.

By analyzing the data, we better understand where we've been and where we're at as an industry, which in turn informs our flight path as we continue our journey. For Boeing, that journey includes the ongoing development of increasingly better safety analytics and making steady progress with the implementation of an enterprise Safety Management System (SMS).

Through our SMS, we will manage safety risks throughout the product life cycle by incorporating data from regulators, customers, employee reporting and existing production, compliance, quality and safety processes. Ultimately, the intent of Boeing's SMS is to bring the right data into the right forums to make data-driven, risk-based decisions that help prevent accidents and protect people.

This report provides the opportunity for a moment of reflection—about the improvements that have been made and the work we have yet to collectively do for the crews, passengers and those who create and maintain jet airplanes.

When it comes to safety, our work is never done.

Elisabeth Martin

Vice President, Enterprise Safety and Mission Assurance
Product & Services Safety

Statistical Summary 2020

This is the 52nd edition of this document, which Boeing has published every year since 1969. The data and Boeing's analyses in the following pages underscore the vast safety improvements that were made in the first six decades of commercial flight, and call out opportunities to continue to make progress. In part due to data-driven documents like this one and the thinking behind them, commercial aviation has evolved into one of the safest forms of travel ever devised.

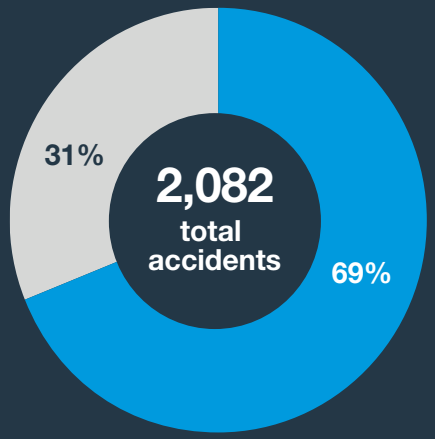
2020 Airplane Accidents | Worldwide Commercial Jet Fleet

Event Date	Airline	Model (Age in Years)	Type of Operation	Accident Location	Phase of Flight	Event Description	Damage Category	Hull Loss	Injury Category	Onboard Fatalities / Occupants (External Fatalities)	Major Accident
1/7/20	Pegasus	737-800 (12)	Sched Pax	Istanbul, Turkey	Landing	The airplane departed the runway shortly after landing, causing substantial damage to landing gear, fan blades and engine. Severe weather conditions and an unstable approach were reported. No injuries were reported.	Substantial				
1/8/20	American Airlines	737-800 (7)	Sched Pax	New York, United States	Standing	The boom of a deicing truck struck the lower surface of the right wing during boarding, causing substantial damage.	Substantial				
1/10/20	Nordwinds	A321 (3)	Positioning Flight	Antalya, Turkey	Landing	While performing a positioning flight, the airplane experienced a hard landing and sustained substantial damage. No injuries were reported.	Substantial	X			
1/27/20	Caspian Airlines	MD-83 (25)	Sched Pax	Bandar Mahshahr, Iran	Landing	The airplane performed an unstable approach and failed to stop on the runway. Minor injuries were reported. The airplane was a total hull loss.	Destroyed	X	Minor		
2/1/20	Air ACT	747-400 (18)	Chartered Cargo	Dammam, Saudi Arabia	Take-off	The airplane sustained substantial damage during takeoff due to incorrect rotation speed and subsequent tail drag. No injuries were reported.	Substantial				
2/3/20	Air Canada	767-300 (31)	Sched Pax	Madrid, Spain	Take-off	Shortly after takeoff, a main landing gear tire blew and debris damaged an engine. The crew performed an air turnback. There were no injuries.	Substantial				
2/5/20	Pegasus	737-800 (11)	Sched Pax	Istanbul, Turkey	Landing	The airplane landed and overran the end of the runway. Damage resulted in a hull loss. There were 3 fatalities.	Destroyed	X	Fatal	3 / 183 (0)	X
2/7/20	Icelandair	757-200 (19)	Sched Pax	Keflavik, Iceland	Landing	The airplane experienced a right-hand landing gear collapse while landing. The airplane sustained substantial damage. There were no injuries.	Substantial				
2/9/20	Utair Aviation	737-500 (21)	Sched Pax	Usinsk, Russia	Landing	The airplane landed short of the runway. Both main landing gears were fractured. There were no injuries.	Substantial				
2/27/20	Turkish Airlines	A321 (7)	Sched Pax	Istanbul, Turkey	Landing	The airplane lost both nose landing gear tires during landing and sustained substantial damage. There were no injuries reported.	Substantial				
3/21/20	American Airlines	757-200 (18)	Sched Pax	Las Vegas, United States	Landing	The airplane experienced a tail strike on landing, resulting in substantial damage. There were no injuries reported.	Substantial				
5/19/20	Swift Air	737-800 (21)	Sched Pax	Victorville, United States	Initial Climb	Several components departed the airplane during climb. The airplane sustained substantial damage. No injuries were reported.	Substantial				
5/22/20	Pakistan International Airlines	A320 (16)	Sched Pax	Karachi, Pakistan	Landing	The airplane impacted the ground during landing. It was destroyed, and multiple fatalities and serious injuries were reported.	Destroyed	X	Fatal	97 / 99 (1)	X
7/9/20	Tam Linhas Aereas	A319 (9)	Sched Pax	Sao Paulo, Brazil	Approach	An abrupt maneuver during approach resulted in a flight attendant sustaining serious injuries. No damage to the aircraft was reported.	None		Serious		
8/7/20	Air India Express	737-800 (14)	Sched Pax	Calicut, India	Landing	The airplane overran the runway upon landing, resulting in multiple serious injuries and 21 fatalities. The airplane was destroyed.	Destroyed	X	Fatal	21 / 190 (0)	X
10/16/20	Vietjet Aviation	A321 (3)	Sched Pax	Dong Hoi, Vietnam	Landing	The airplane experienced a hard landing and sustained substantial damage. No injuries were reported.	Substantial				
12/2/20	Air Djibouti	737-500 (29)	Sched Pax	Garowe, Somalia	Landing	While experiencing wind shear conditions, the airplane landed short of the runway; two tires burst and an engine was damaged. The airplane was evacuated and no injuries were sustained.	Substantial				
17	**Total Accidents**							**5**		**121 Onboard (1 External)**	**3**

Accident Summary by Injury and Damage

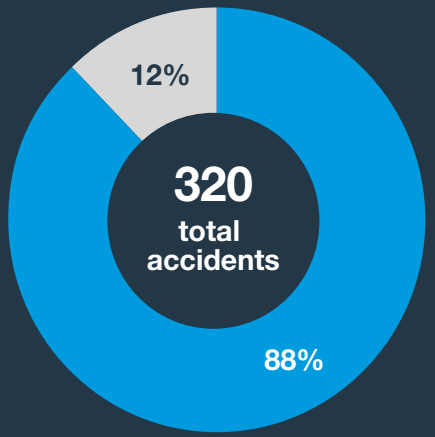
Worldwide Commercial Jet Fleet
1959 through 2020

1959 – 2020



- 1,444 Non-fatal accidents
  - 507 with hull loss
  - 856 with substantial hull damage
  - 81 without substantial hull damage
- 638 Fatal accidents
  - 518 with hull loss
  - 27 with substantial hull damage
  - 93 without substantial hull damage

2011 – 2020



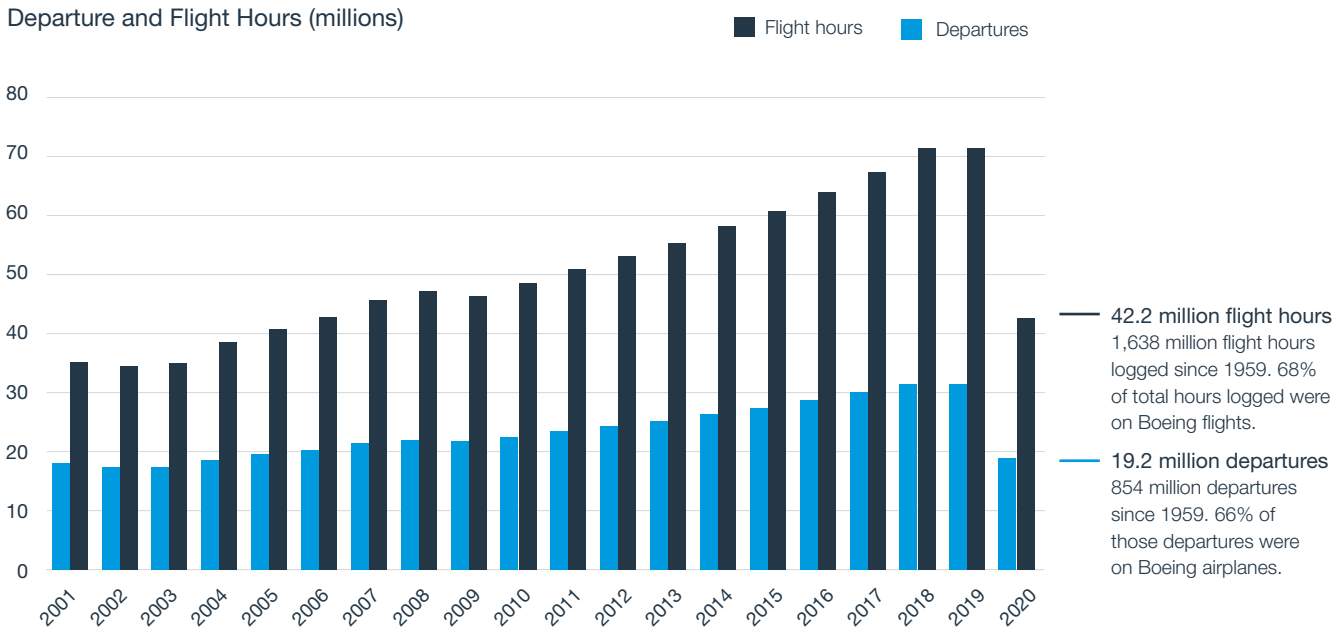
- 281 Non-fatal accidents
  - 85 with hull loss
  - 175 with substantial hull damage
  - 21 without substantial hull damage
- 39 Fatal accidents
  - 31 with hull loss
  - 2 with substantial hull damage
  - 6 without substantial hull damage

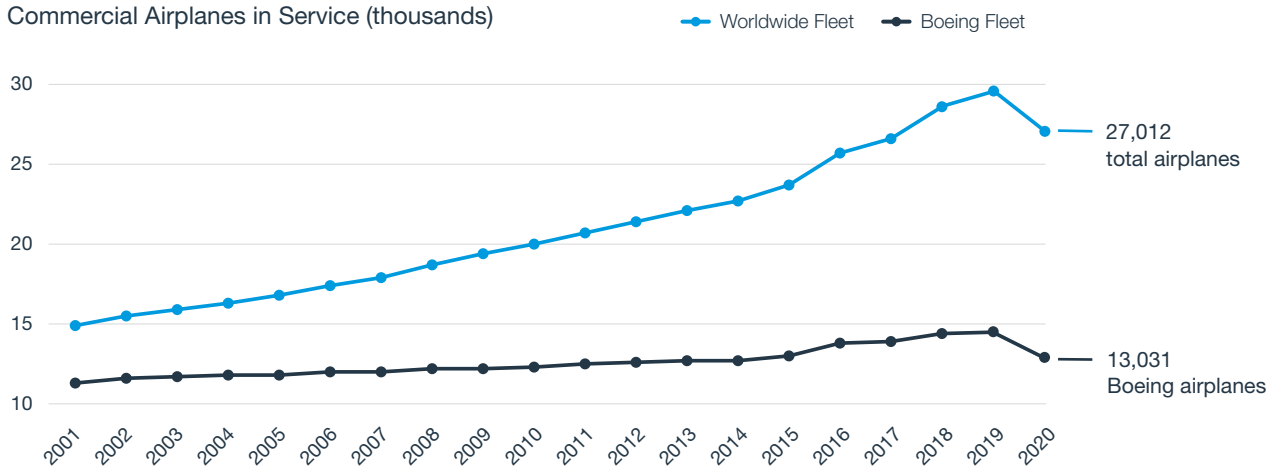
The terms “hull damage” and “hull loss” refer to the severity of damage an airplane incurs from an accident.

Departures, Flight Hours, and Jet Airplanes in Service*

Worldwide Commercial Jet Fleet 2001 through 2020

Over the past 20 years, the gap has grown between total number of departures and total flight hours. Following a decade of above average traffic growth, the COVID-19 pandemic significantly affected air travel in 2020. Despite this unprecedented challenge, the worldwide airplane fleet and commercial air traffic are expected to continue to grow over the next 20 years.





Source: 2001 – 2019, Jet Information Services, Inc. 2020: Cirium
* Certified jet airplanes greater than 60,000 pounds maximum gross weight, including those in temporary nonflying status and those in use by non-airline operators. Excluded are commercial airplanes operated in military service and CIS-, USSR- or PRC-manufactured airplanes.

Accident Summary by Type of Operation

Worldwide Fleet
60- and 10-Year Totals

Worldwide Commercial Jet Fleet

Type of Operation	All Accidents		Fatal Accidents		Onboard Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959–2020	2011–2020	1959–2020	2011–2020	1959–2020	2011–2020	1959–2020	2011–2020
Passenger	1,666	271	511	31	30,132 (805)	1,752 (28)	757	87
- Scheduled	1,543	262	464	29	25,935	1,669	686	83
- Charter	123	9	47	2	4,197	83	71	4
Cargo	292	43	83	8	285 (385)	23 (55)	192	25
Maintenance test, ferry, positioning, training, and demonstration	124	6	44	0	208 (66)	0 (0)	76	4
Totals	**2,082**	**320**	**638**	**39**	**30,625 (1,256)**	**1,775 (83)**	**1,025**	**116**

U.S. / Canada vs. Rest of World

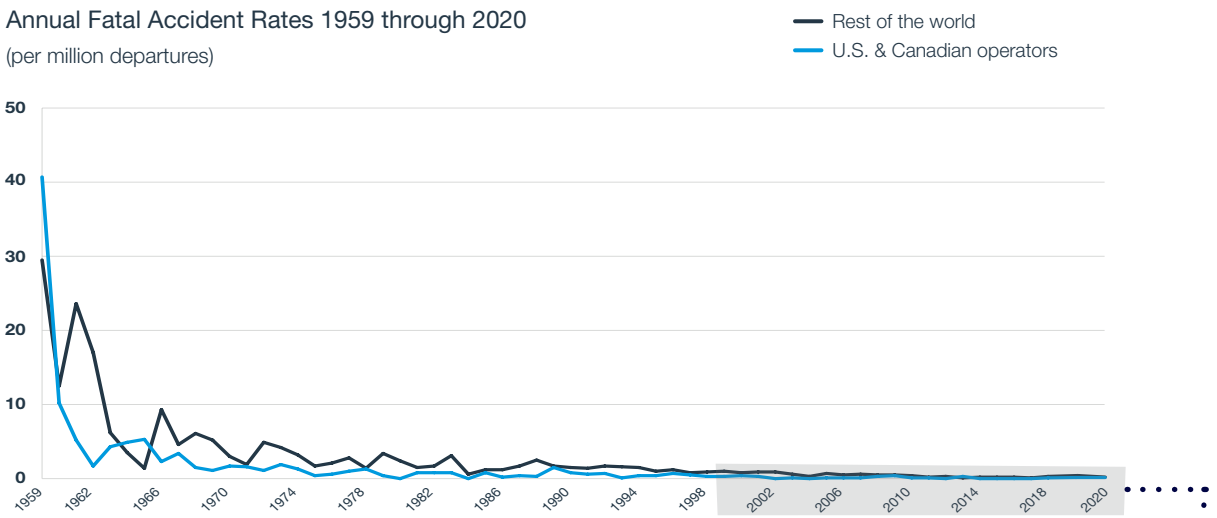
Type of Operation	All Accidents		Fatal Accidents		Onboard Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959–2020	2011–2020	1959–2020	2011–2020	1959–2020	2011–2020	1959–2020	2011–2020
U.S. and Canadian Operators	607	61	184	5	6,206 (381)	25 (0)	238	18
Rest of World	1,475	259	454	34	24,419 (875)	1,750 (83)	787	98
Totals	**2,082**	**320**	**638**	**39**	**30,625 (1,256)**	**1,775 (83)**	**1,025**	**116**

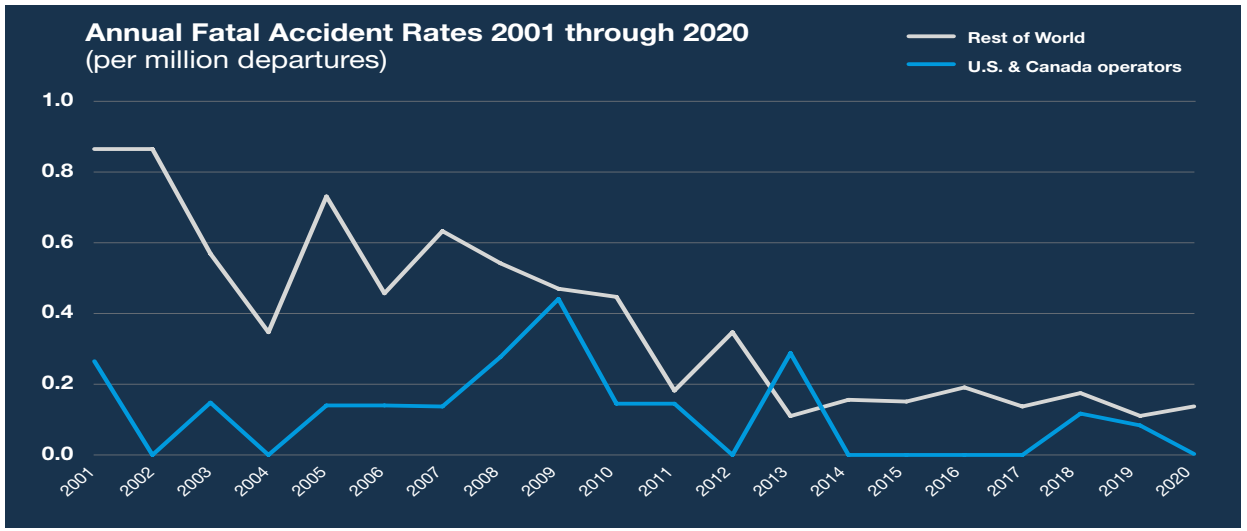
* External fatalities include on-ground fatalities as well as fatalities on other aircraft involved.

U.S. and Canadian Operator Accident Rates by Year

Worldwide Commercial Jet Fleet 2000 through 2020

The first decade of the jet age saw dramatic improvements in fatal accident rates. Since then, metrics appear to taper off, which is not the case. Fatal accident rates are lower than they were 20 years ago.



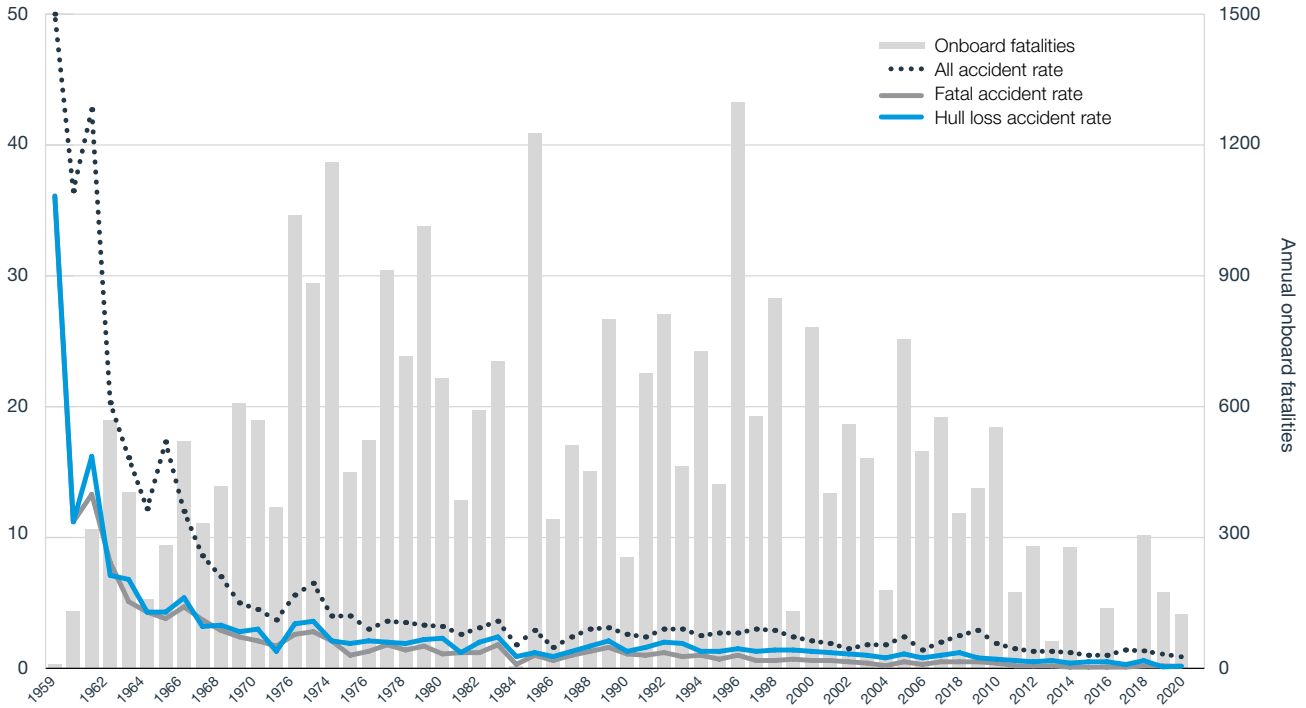


Accident Rates and Onboard Fatalities by Year

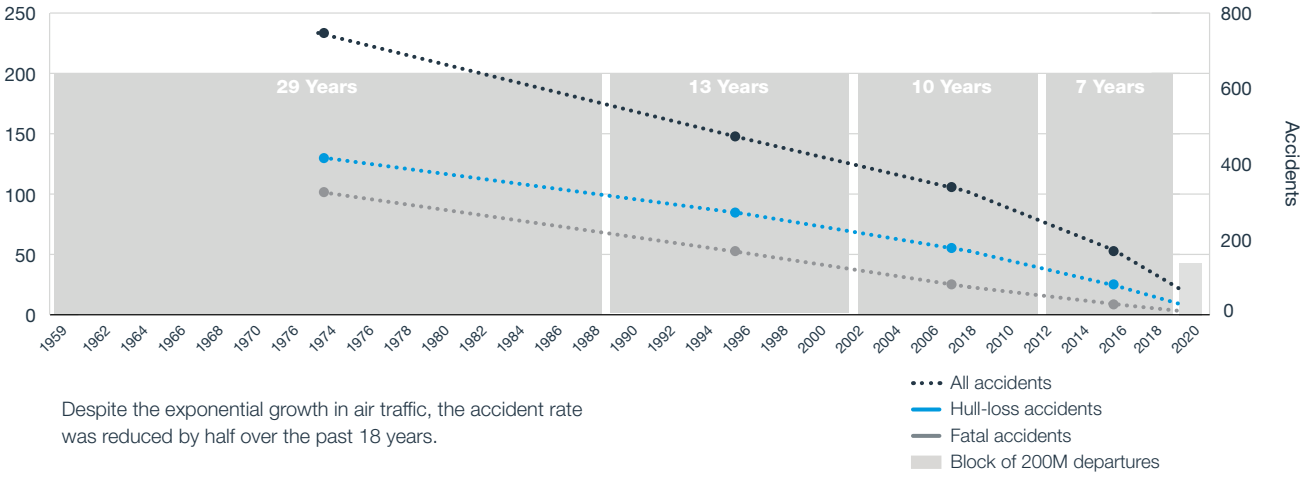
Worldwide Commercial Jet Fleet 1959 through 2020

Viewing accident rates against departures is a meaningful way to measure advances in aviation safety. Over the past 60 years, hull losses and onboard fatalities declined dramatically while the number of flights continued to rise.

Accident Rates and Onboard Fatalities per One Million Departures



Accident Rates and Onboard Fatalities per 200 Million Departures

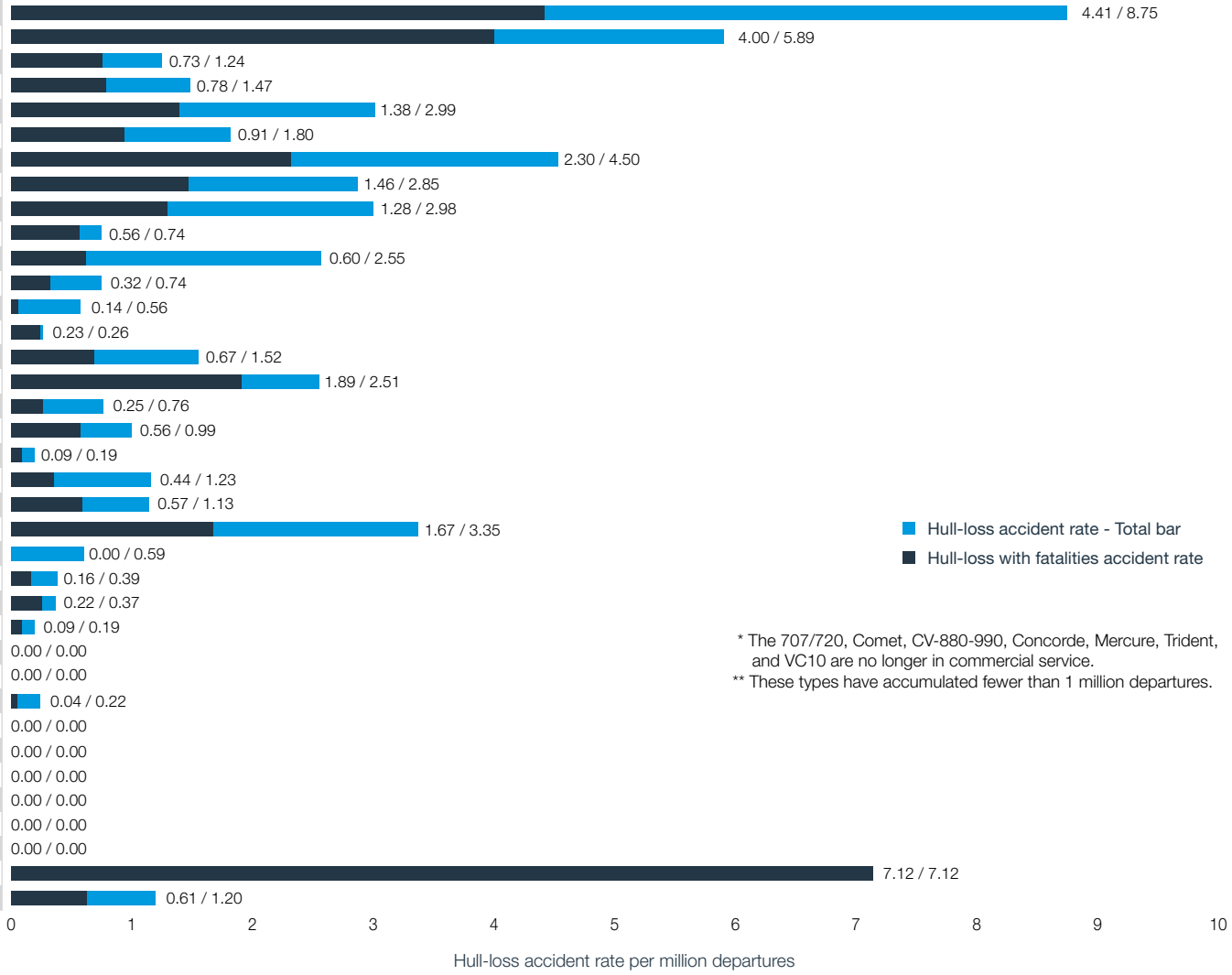


Despite the exponential growth in air traffic, the accident rate was reduced by half over the past 18 years.

Accident Rates by Airplane Type

Hull Loss Accidents | Worldwide Commercial Jet Fleet | 1959 - 2020

Sorted by Year of Introduction	Hull Loss	Fatal Hull Loss	
*No Longer in Service	252	127	4.41 / 8.75
DC-8	75	51	4.00 / 5.89
727	95	56	0.73 / 1.24
DC-9	92	49	0.78 / 1.47
BAC 1-11	26	12	1.38 / 2.99
737-100/-200	105	53	0.91 / 1.80
F-28	43	22	2.30 / 4.50
747-100/-200/-300/SP	37	19	1.46 / 2.85
DC-10/MD-10	28	12	1.28 / 2.98
L-1011	4	3	0.56 / 0.74
A300	17	4	0.60 / 2.55
MD-80/-90	35	15	0.32 / 0.74
767	12	3	0.14 / 0.56
757	7	6	0.23 / 0.26
BAe 146, RJ-70/-85/-100	18	8	0.67 / 1.52
A310	12	9	1.89 / 2.51
737-300/-400/-500	58	19	0.25 / 0.76
A300-600	7	4	0.56 / 0.99
A320/321/319/318	28	13	0.09 / 0.19
F-100/F-70	14	5	0.44 / 1.23
747-400	10	5	0.57 / 1.13
MD-11	10	5	1.67 / 3.35
A340	2	0	0.00 / 0.59
A330	5	2	0.16 / 0.39
777	5	3	0.22 / 0.37
737-600/-700/-800/-900	21	10	0.09 / 0.19
717	0	0	0.00 / 0.00
CRJ-700/-900/-1000	0	0	0.00 / 0.00
EMB-170/-175/-190	5	1	0.04 / 0.22
**A380	0	0	0.00 / 0.00
787	0	0	0.00 / 0.00
**747-8	0	0	0.00 / 0.00
**A350	0	0	0.00 / 0.00
**C-Series/A220	0	0	0.00 / 0.00
**A320/321/319 NEO	0	0	0.00 / 0.00
**737 MAX	2	2	7.12 / 7.12
Total	**1025**	**518**	0.61 / 1.20



CAST/ICAO Common Taxonomy Team Aviation Occurrence Categories

The International Civil Aviation Organization (ICAO) and the Commercial Aviation Safety Team (CAST), which includes government officials and aviation industry leaders, have jointly chartered the CAST/ICAO Common Taxonomy Team (CICTT). CICTT includes experts from several air carriers; aircraft manufacturers; engine manufacturers; pilot associations; regulatory authorities; transportation safety boards; ICAO; and members from Canada, the European Union, France, Italy, the Netherlands, the United Kingdom, and the United States. CICTT is co-chaired by one representative each from ICAO and CAST.

The team is charged with developing common taxonomies and definitions for aviation accident and incident reporting systems. Common taxonomies and definitions establish a standard industry language, thereby improving the quality of information and communication. With this common language, the aviation community's capacity to focus on common safety issues is greatly enhanced.

The CICTT Aviation Occurrence Taxonomy is designed to permit an assignment of multiple categories as necessary to describe the accident or incident. Since 2001, the Occurrence Validation Study Group (OVSG), formerly Safety Indicator Steering Group (SISG) has met annually to assign CICTT occurrence categories to the prior year's accidents.

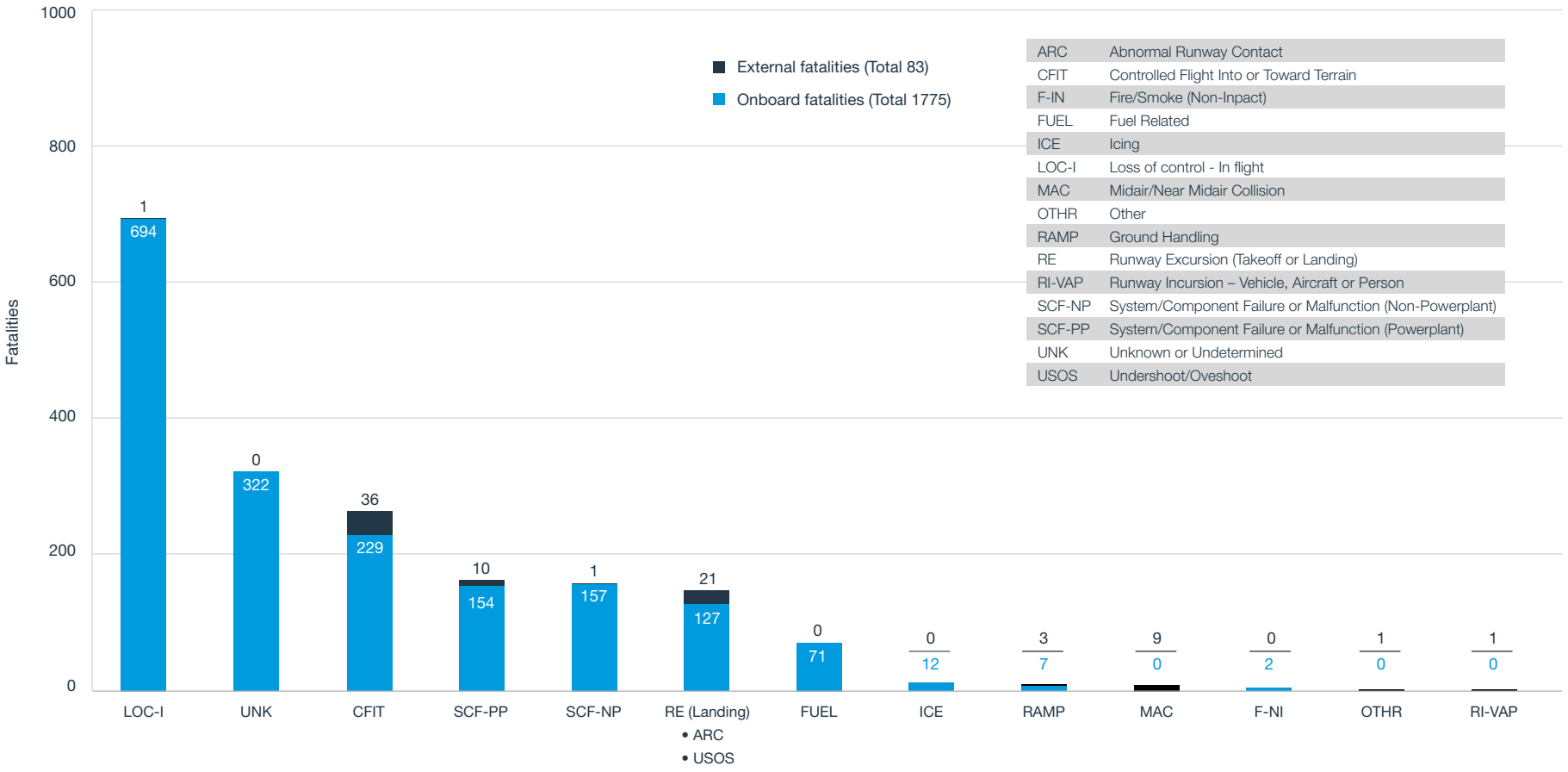
In a separate activity, the CAST assigned each fatal accident to a single principal category. Those accident assignments and a brief description of the categories are reported in the following chart.

The CAST use of principal categories has been instrumental in focusing industry and government efforts and resources on accident prevention. Charts using principal categories are used by CAST to identify changes to historical risk and to help to determine if the safety enhancements put in place are effective.

For a complete description of the categories, go to www.intlaviationstandards.org.

Fatalities by CICTT Aviation Occurrence Categories

Fatal Accidents | Worldwide Commercial Jet Fleet | 2011 through 2020



ARC	Abnormal Runway Contact
CFIT	Controlled Flight Into or Toward Terrain
F-IN	Fire/Smoke (Non-Inpact)
FUEL	Fuel Related
ICE	Icing
LOC-I	Loss of control - In flight
MAC	Midair/Near Midair Collision
OTHR	Other
RAMP	Ground Handling
RE	Runway Excursion (Takeoff or Landing)
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/Oveshoot

Number of fatal accidents (39 total)

LOC-I	UNK	CFIT	SCF-PP	SCF-NP	RE (Landing)	FUEL	ICE	RAMP	MAC	F-NI	OTHR	RI-VAP
8	3	6	2	2	7	1	1	4	2	1	1	1

Note: Principal categories as assigned by CAST.
For a complete description of CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories, go to www.intlaviationstandards.org.

Fatal Accidents and Fatalities by Phase of Flight

Worldwide Commercial Jet Fleet 2011 through 2020

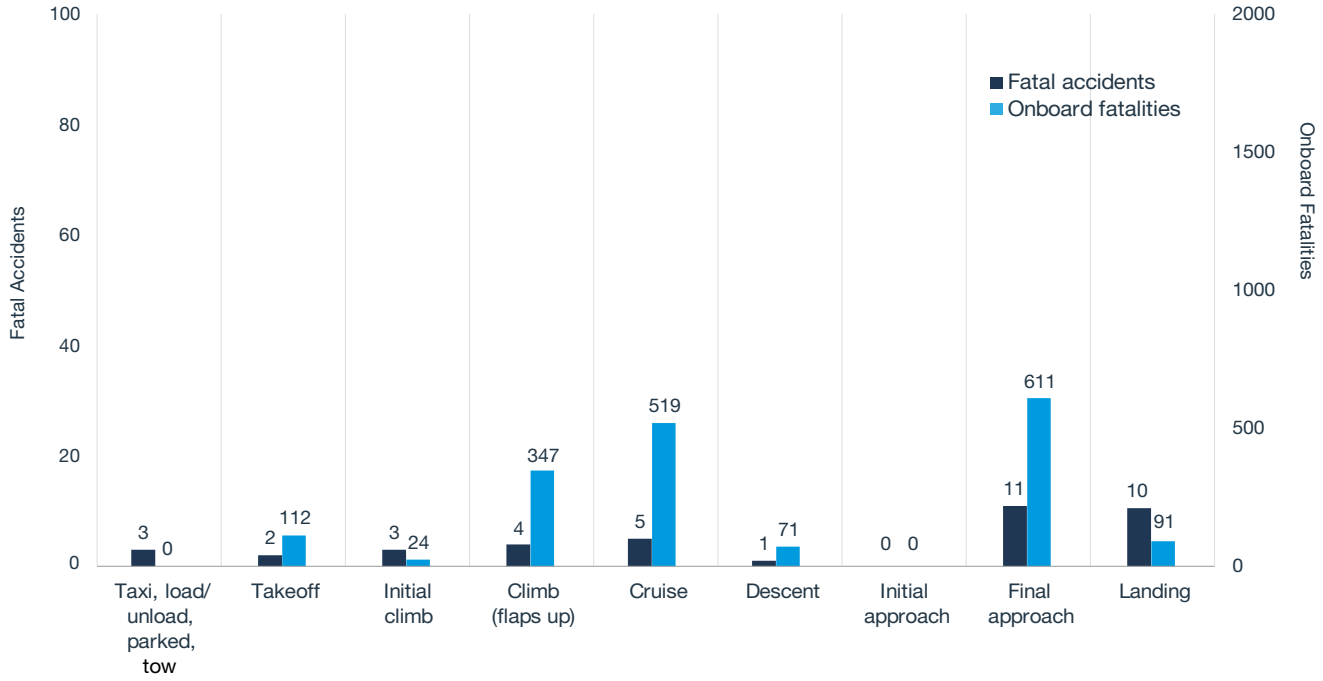
While cruising at altitude makes up the majority of time in the air, this phase of flight accounts for 13% of all fatal accidents. Conversely, over half of all fatal accidents occur during final approach and landing. Most safety-related improvements over the past few decades have focused on taxiing, climbing, approach, and landing phases.

Percentage of fatal accidents and onboard fatalities | 2011 through 2020

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		13%						54%	
Fatal accidents	8%	5%	8%	10%	13%	3%	0%	28%	26%
Onboard fatalities	0%	6%	1%	20%	29%	4%	0%	34%	5%
		8%						40%	
Exposure (percentage of flight time estimated for a 1.5-hour flight)		1%	1%	14%	57%	*Initial approach fix* 11%	*Final approach fix* 12%	3%	1%

Note: Percentages may not sum to 100% because of numerical rounding.

Distribution of fatal accidents and onboard fatalities | 2011 through 2020



About this Document

The accident statistics presented in this summary are confined to worldwide commercial jet airplanes that are heavier than 60,000 pounds maximum gross weight. Within that set of airplanes, there are two groups excluded:

1. Airplanes manufactured in the Commonwealth of Independent States (CIS), the Union of Soviet Socialist Republics (USSR) or the People's Republic of China (PRC) due to lack of operational data.

2. Commercial airplanes operated in military service. (However, if a military-owned commercial jet transport is used for civilian commercial service, those data will be included in this summary.)

The following airplanes are included in the statistics:

Boeing		**Airbus**	**BAE SYSTEMS (Avro)**	**BAE SYSTEMS (HS)**	**Embraer**	**Lockheed**
707/720	DC-8	A300	Avro RJ70/85/100	BAe 146	E170/175	L-1011
727	DC-9	A300-600		Comet 4	E190/195	
737	DC-10/MD-10	A310	**BAE SYSTEMS (BAC)**	Trident		**Dassault Aviation**
747	MD-11	A320/321/319/318	Concorde		**Fokker**	Mercure
757	MD-80/-90	A330	One-Eleven	**Bombardier**	F28	
767		A340	VC10	CRJ700/900/1000	F70	**General Dynamics (Convair)**
777		A350			F100	
787		A380		**Aerospatiale**		CV-880/-990
717		A220/C Series		Caravelle		

Flight operations data for Boeing airplanes are developed internally from airline operator reports. Flight operations data for non-Boeing airplanes are compiled by Cirium. The source of jet airplane inventory data is Jet Information Services, Inc.

Accident data are obtained, when available, from government accident reports. Otherwise, information is from operators, manufacturers, various government and private information services, and press accounts.

Readers may note that cumulative accident totals from year to year may not exactly correlate with the expected change from the previous year's accidents. This is a result of periodic audits of the entire accident history for updates to the data.

Definitions related to development of statistics in this summary are primarily based on corresponding International Civil Aviation Organization (ICAO), U.S. National Transportation Safety Board (NTSB), and Flight Safety Foundation (FSF) terms, as explained in the next section.

Definitions

Airplane Accident

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:

- The airplane sustains substantial damage.
- The airplane is missing or is completely inaccessible. An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.
- Death or serious injury results from:
    - Being in the airplane.
    - Direct contact with the airplane or anything attached thereto.
    - Direct exposure to jet blast.

Excluded Events

- Fatal and nonfatal injuries from natural causes.
- Fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Nonfatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Nonfatal injuries to persons not aboard the airplane.

The following occurrences are **not** considered airplane accidents: those that are the result of experimental test flights or the result of a hostile action, including sabotage, hijacking, terrorism, and military action.

Note: This is generally consistent with the ICAO and the NTSB definition of an accident. (See the Referenced ICAO and NTSB Definitions section.)

The differences are:

1. The ICAO and NTSB references to “aircraft” were changed to “airplane” and references to propellers and rotors were eliminated.
2. This publication excludes events that result in nonfatal injuries from atmospheric turbulence, normal maneuvering, etc.; nonfatal injuries to persons not aboard the airplane; and any events that result from an experimental test flight or from hostile action, such as sabotage, hijacking, terrorism, and military action.

Note: Within this publication, the term “accident” is used interchangeably with “airplane accident.”

Definitions

Destroyed

The estimated or likely cost of repairs would have exceeded 50 percent of the new value of the airplane had it still been in production at the time of the accident.

Note: This definition is consistent with the FSF definition. NTSB defines "destroyed" as damaged due to impact, fire, or in-flight failures to an extent not economically repairable.

Fatal Injury

Any injury that results in death within 30 days of the accident.

Note 1: This is consistent with both the ICAO and the NTSB definitions.

Note 2: External fatalities include on-ground fatalities as well as fatalities on other aircraft involved.

Major Accident

An accident in which any of three conditions is met:

- The airplane was destroyed.
- There were multiple fatalities.
- There was one fatality and the airplane was substantially damaged.

Note: This definition is consistent with the NTSB definition. It also is generally consistent with FSF, except that the FSF definition specifies that fatalities include only occupants of the airplane. ICAO does not normally define the term "major accident."

Serious Injury

An injury that is sustained by a person in an accident and that:

- Requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received.
- Results in a fracture of any bone (except simple fractures of fingers, toes, or nose).
- Causes severe hemorrhage, nerve, muscle, or tendon damage.
- Involves injury to any internal organ.
- Involves second- or third-degree burns, or any burns affecting more than five percent of the body surface.
- Involves verified exposure to infectious substances or injurious radiation.

Note: This is generally consistent with the ICAO definition. It is also consistent with the NTSB definition except for the last bullet item, which is not included in the NTSB definition.

Definitions

Substantial Damage

Damage or failure that adversely affects the structural strength, performance, or flight characteristics of the airplane, and that would normally require major repair or replacement of the affected component.

Substantial damage is **not** considered to be:

- Engine failure or damage limited to an engine, if only one engine fails or is damaged.
- Bent fairings or cowlings.
- Dents in the skin.
- Small puncture holes in the skin.
- Damage to wheels.
- Damage to tires.
- Damage to flaps.
- Damage to engine accessories.
- Damage to brakes.
- Damage to wingtips.

Note 1: This definition is generally consistent with the NTSB definition of substantial damage except it (1) deletes reference to “small puncture holes in the fabric” and “ground damage to rotor or propeller blades,” and (2) deletes “damage to landing gear” from the list of items not considered to be substantial damage.

Note 2: ICAO does not define the term “substantial damage.” Still, the above definition is generally consistent with the ICAO definition of damage or structural failure contained within part (B) of the ICAO accident definition.

Note 3: Boeing does not consider damage to be substantial if repairs to an event airplane enable it to be flown to a repair base within 48 hours of the event.

Boeing Terms*

Accident Rates

In general, this expression is a measure of accidents per million departures. Departures (or flight cycles) are used as the basis for calculating rates because there is a stronger statistical correlation between accidents and departures than there is between accidents and flight hours, or between accidents and the number of airplanes in service, or between accidents and passenger miles or freight miles. Airplane departures data are continually updated and revised as new information and estimating processes become available. These form the baseline for the measure of accident rates and, as a consequence, rates may vary between editions of this publication.

Airplane Collisions

Events involving two or more airplanes are counted as separate events, one for each airplane. For example, destruction of two airplanes in a collision is considered to be two separate accidents.

Fatal Accident

An accident that results in fatal injury.

Hull Loss

Airplane totally destroyed or damaged and not repaired. Hull loss also includes, but is not limited to, events in which

- The airplane is missing. An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.
- The airplane is completely inaccessible.

*The terms on this page were created by Boeing for this publication and do not have corresponding equivalents in ICAO or NTSB.

Exclusions*

Excluded Airplanes

Airplanes manufactured in the Commonwealth of Independent States (CIS), the Union of Soviet Socialist Republics (USSR) or the People's Republic of China (PRC) are excluded because of the lack of operational data. Commercial airplanes operated in military service are generally excluded. (If a military-owned commercial jet transport is used for civilian commercial service, those data are included in this summary.)

Excluded Events

- Fatal and nonfatal injuries from natural causes.
- Fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Nonfatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Nonfatal injuries to persons not aboard the airplane.
- Experimental test flights. (However, maintenance test flights, ferry, positioning, training, and demonstration flights are not excluded.).
- Sabotage, hijacking, terrorism, and military action.

*Certain airplanes and events are excluded from consideration as accidents in this summary. This is a complete list of those exclusions.

Referenced ICAO and NTSB Definitions*

Accident

ICAO defines an “accident” as follows:

Accident. An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

A. A person is fatally or seriously injured as a result of:

- Being in the aircraft, or
- Direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- Direct exposure to jet blast, *except* when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew.

B. The aircraft sustains damage or structural failure which:

- Adversely affects the structural strength, performance, or flight characteristics of the aircraft, and
- Would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine (including its cowlings or accessories), to propellers, wingtips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome).

C. The aircraft is missing or is completely inaccessible.

NTSB defines an “aircraft accident” as follows:

Aircraft accident means 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. For purposes of this part, the definition of “aircraft accident” includes “unmanned aircraft accident,” as defined in 49 CFR 830.2.

*International Civil Aviation Organization (ICAO) and National Transportation Safety Board (NTSB) definitions are included below for reference.

Referenced ICAO and NTSB Definitions*

Safety Management System (SMS)

ICAO defines a SMS as follows:

A safety management system (SMS) is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. Visit www.icao.int/safety/SafetyManagement for more information.

Serious Injury

ICAO defines "serious injury" as follows:

Serious Injury. An injury that is sustained by a person in an accident and which:

A. Requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or

B. Results in a fracture of any bone (except simple fractures of fingers, toes or nose); or

C. Involves lacerations that cause severe hemorrhage, nerve, muscle, or tendon damage; or

D. Involves injury to any internal organ; or

E. Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface; or

F. Involves verified exposure to infectious substances or injurious radiation.

NTSB defines "serious injury" as follows:

Serious injury means any injury that

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 five percent of the body surface.

Substantial Damage

NTSB defines "substantial damage" as follows:

Substantial damage means damage or failure that 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.

ICAO does not define the term "substantial damage."

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