



STATISTICAL SUMMARY OF COMMERCIAL JET AIRPLANE ACCIDENTS

Worldwide Operations | 1959 – 2021

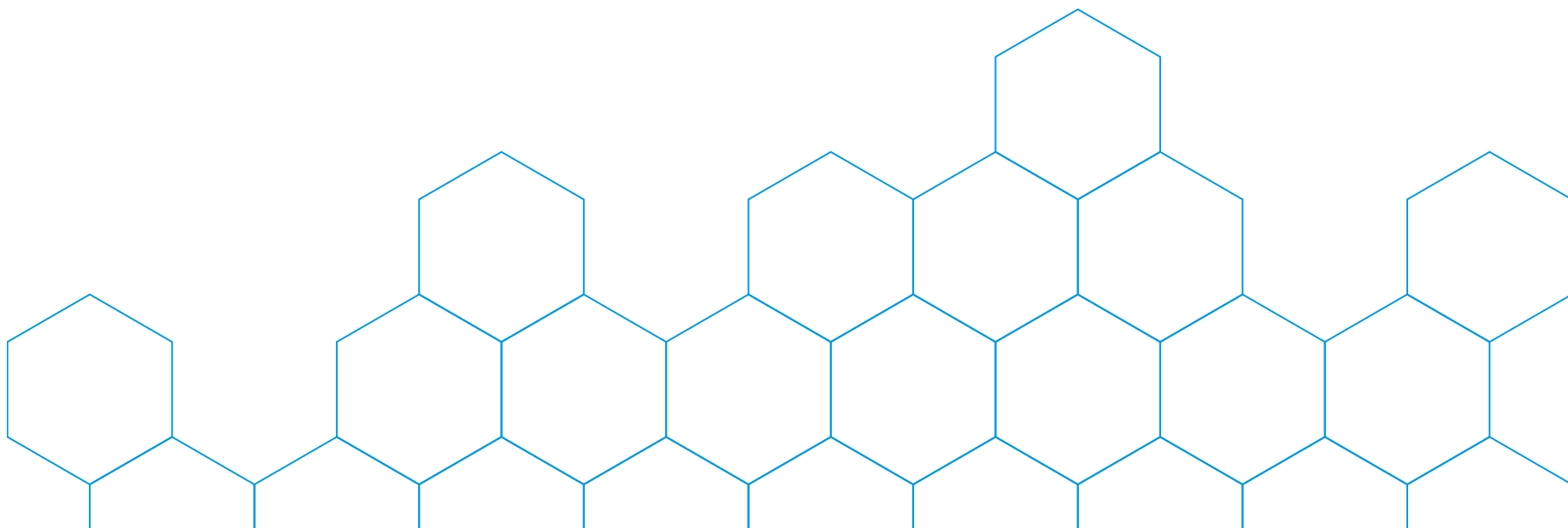


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When we take flight, safety is above everything else.

It's this mindset that has always propelled the aviation industry. This year's Statistical Summary charts the year-to-year progress resulting from decades of innovation and other safety advancements in commercial air travel. More importantly, the report underscores our shared commitment to further advance aviation safety around the world.

As part of Boeing's efforts, we've implemented a series of meaningful changes to strengthen our own safety practices and culture. Through the Boeing Chief Aerospace Safety Office, which was established in 2021, we are increasing the oversight of our processes and procedures while collaborating with customers, regulators and other industry stakeholders to improve operational safety. With the implementation of our enterprisewide Safety Management System, we are enhancing our data-driven approach to proactively identify risks and monitor emerging safety trends. We are making steady progress across the board as we introduce these improvements, realizing our work to raise the bar on safety is never done.

The data in this year's report serves as a benchmark for the entire aviation industry as we continue our mission to make air travel even safer. Through transparency and openness, all of us are collectively working to help prevent accidents, injuries and loss of life.

Safety is a continuous and collaborative journey, and we are committed to doing our part.

Elisabeth Martin

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

Statistical Summary 2021

This is the 53rd edition of the Boeing Statistical Summary of Commercial Jet Airplane Accidents, which has been published by the company every year since 1969. The annual report provides data and statistical analysis to yield key insights into the safety of commercial air travel worldwide. The information contained in this report can be used by the aviation industry to identify global trends and opportunities to advance safety. The findings underscore the importance of the industry's continuous pursuit of new levels of safety in order to prevent accidents, injury or loss of life.



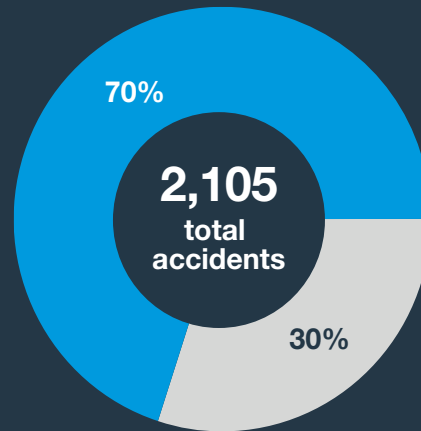
2021 Airplane Accidents | Worldwide Commercial Jet Fleet

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
1/9/21	Sriwijaya	737-500 (27)	Sched Pax	Jakarta, Indonesia	Takeoff	The airplane lost altitude and impacted the sea shortly after takeoff. The airplane was destroyed and there were 62 fatalities.	Destroyed	X	Fatal	62 / 62 (0)	X
1/19/21	West Atlantic	737-400 (26)	Charter Cargo	Exeter, United Kingdom	Landing	The airplane experienced a hard landing, resulting in a hull loss. There were no injuries or fatalities.	Substantial	X			
2/1/21	Nippon Cargo Airlines	747-8F (9)	Sched Cargo	Tokyo, Japan	Landing	While performing a go-around, the airplane experienced a tail strike and was substantially damaged. There were no injuries or fatalities.	Substantial				
2/20/21	Air India Express	737-800 (4)	Sched Pax	Vijayawada, India	Taxi	While taxiing, the airplane collided with a light pole and was substantially damaged. There were no injuries or fatalities.	Substantial				
3/18/21	Viva	A320 (15)	Sched Pax	Puerto Vallarta, Mexico	Taxi	While taxiing, the airplane experienced a nose gear collapse and was substantially damaged. There were no injuries or fatalities.	Substantial				
3/20/21	Trigana	737-400 (32)	Charter Cargo	Jakarta, Indonesia	Landing	When landing after an engine failure and air turnback, the airplane experienced a partial gear collapse and departed the runway. The airplane was a hull loss. There were no injuries or fatalities.	Substantial	X			
4/25/21	Air Falcon	737-300 (24)	Sched Cargo	Bosaso, Somalia	Takeoff	The airplane encountered runway foreign object debris on takeoff and was substantially damaged. There were no injuries or fatalities.	Substantial				
5/21/21	Southwest Airlines	737-700 (14)	Sched Pax	Chicago, United States	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. There were no injuries or fatalities.	Substantial				
5/28/21	American Airlines	737-800 (11)	Sched Pax	Dallas, United States	Taxi	While taxiing, the airplane collided with a light pole and was substantially damaged. There were no injuries or fatalities.	Substantial				
6/18/21	British Airways	787-8 (8)	Sched Cargo	London, United Kingdom	Standing	The airplane experienced a nose gear collapse during maintenance and was substantially damaged. There was one minor injury.	Substantial		Minor		
7/2/21	Transair	737-200 (46)	Sched Cargo	Honolulu, United States	Climb	The airplane experienced an engine failure and was ditched into the water while attempting an air turnback. The airplane was destroyed. There was one serious injury.	Destroyed	X	Serious		
7/11/21	Condor	A320 (18)	Sched Pax	Kavala, Greece	Takeoff	The airplane experienced a nose landing gear problem and was substantially damaged. There were no injuries or fatalities.	Substantial				
7/22/21	Delta Airlines	A321 (2)	Sched Pax	Detroit, United States	Taxi	The airplane stopped abruptly while taxiing. There was one serious injury. The airplane was undamaged.	None		Serious		
8/11/21	United Parcel Service	MD-11F (29)	Sched Cargo	Phoenix, United States	Landing	The airplane experienced substantial damage while landing. There were no injuries or fatalities.	Substantial				
8/27/21	Jazz	CRJ-900 (15)	Sched Pax	Vancouver, Canada	Landing	The airplane experienced a hard landing and was substantially damaged. There was one serious injury.	Substantial		Serious		
9/1/21	Delta Airlines	767-300 (27)	Sched Pax	Seattle, United States	Taxi	While on the ground, the airplane stopped abruptly. There was no damage to the airplane. There was one serious injury.	None		Serious		
9/15/21	Austrian	A320 (9)	Sched Pax	Berlin, Germany	Standing	Ground equipment collided with the airplane, and the airplane was substantially damaged. There were no injuries or fatalities.	Substantial				
9/23/21	Hawaiian Airlines	A321 (3)	Sched Pax	Honolulu, United States	Landing	The airplane experienced a tail strike on landing and was substantially damaged. There were no injuries or fatalities.	Substantial				
9/27/21	United Airlines	757-200 (24)	Sched Pax	Newark, United States	Landing	The airplane experienced a tail strike on landing and was substantially damaged. There were no injuries or fatalities.	Substantial				
10/23/21	Envoy	ERJ-175 (5)	Sched Pax	Miami, United States	Pushback	The airplane experienced an abrupt motion during pushback. The airplane was not damaged. There was one serious injury.	None		Serious		
11/29/21	Kalitta Air	747-400F (20)	Charter Cargo	Miami, United States	Landing	While landing, components departed the airplane, resulting in substantial damage. There were no injuries or fatalities.	Substantial				
12/15/21	Air Transat	A321 (1)	Sched Pax	Near Pittsburgh, United States	En Route	While in flight, a flight attendant was seriously injured by cabin equipment. There was no damage to the airplane.	None		Serious		
12/25/21	Air Canada	A330 (22)	Sched Pax	Montreal, Canada	Landing	Upon landing, the airplane experienced substantial damage to the right main landing gear tires and bogie. There were no injuries or fatalities.	Substantial				
23	Total Accidents							4		62 Onboard (0 External)	1

Accident Summary by Injury and Damage

Worldwide Commercial Jet Fleet
1959 through 2021

1959 – 2021



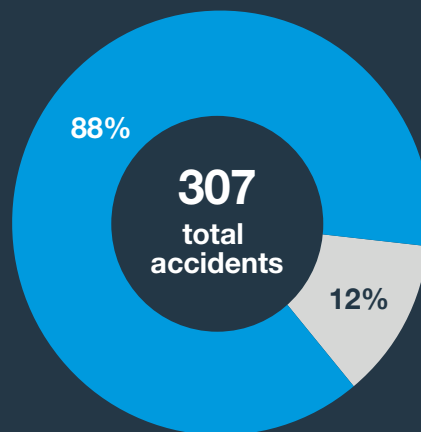
1,466 Non-fatal accidents

- 510 with hull loss
- 873 with substantial damage
- 83 without substantial damage

639 Fatal accidents

- 519 with hull loss
- 27 with substantial damage
- 93 without substantial damage

2012 – 2021



271 Non-fatal accidents

- 78 with hull loss
- 172 with substantial damage
- 21 without substantial damage

36 Fatal accidents

- 28 with hull loss
- 2 with substantial damage
- 6 without substantial damage

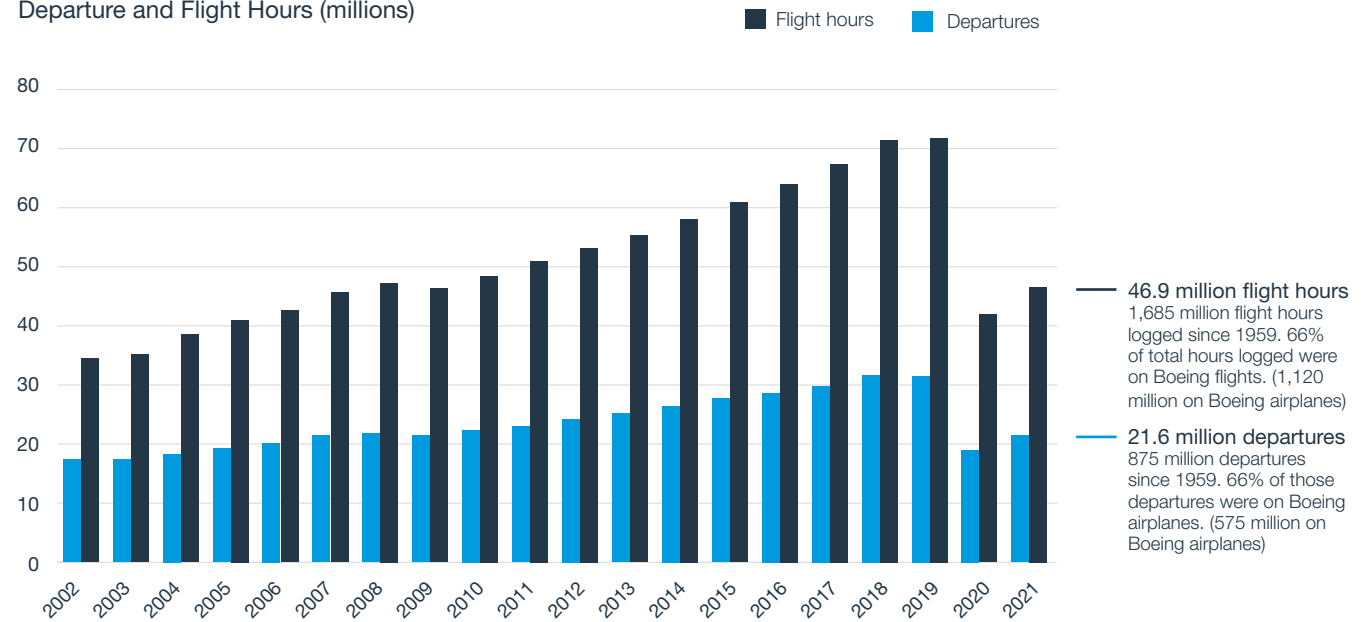
The terms "hull damage" and "hull loss" refer to the severity of damage an airplane incurs from an accident.

Departures, Flight Hours, and Jet Airplanes in Service*

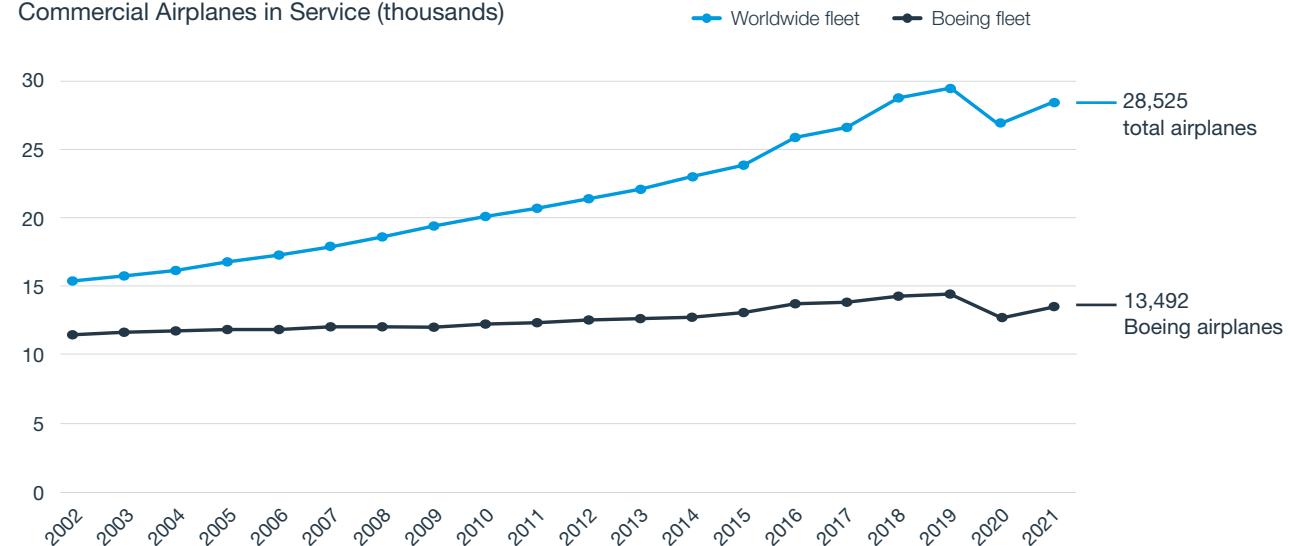
Worldwide Commercial Jet Fleet 2002 through 2021

Over the past 20 years, the statistics show a growing trend in the gap between total number of departures and total flight hours. While passenger traffic continues to rebound worldwide, the COVID-19 pandemic significantly affected global air travel numbers in both 2020 and 2021. However, the worldwide airplane fleet and commercial air traffic are expected to continue to grow over the next two decades.

Departure and Flight Hours (millions)



Commercial Airplanes in Service (thousands)



Source: 2002 - 2019, Jet Information Services, Inc.
2020 - 2021: Cirium

* Certified jet airplanes greater than 60,000 pounds maximum gross weight, including those in temporary non-flying status and those in use by non-airline operators. Excluded are commercial airplanes operated in military service and CIS/USSR/PRC-manufactured airplanes.

Accident Summary by Type of Operation

Worldwide Commercial Jet Fleet

Type of Operation	All Accidents		Fatal Accidents		Onboard Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959–2021	2012–2021	1959–2021	2012–2021	1959–2021	2012–2021	1959–2021	2012–2021
Passenger	1,681	256	512	29	30,192 (805)	1,639 (28)	758	77
– Scheduled	1,558	250	465	28	25,995	1,568	687	75
– Charter	123	6	47	1	4,197	71	71	2
Cargo	300	48	83	7	285 (385)	21 (55)	195	26
Maintenance test, ferry, positioning, training, and demonstration	124	3	44	0	208 (66)	0 (0)	76	3
Totals	2,105	307	639	36	30,685 (1,256)	1,660 (83)	1,029	106

U.S. / Canada vs. Rest of World

Type of Operation	All Accidents		Fatal Accidents		Onboard Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959–2021	2012–2021	1959–2021	2012–2021	1959–2021	2012–2021	1959–2021	2012–2021
U.S. and Canadian Operators	622	64	184	4	6,206 (381)	13 (0)	239	17
Rest of World	1,483	243	455	32	24,479 (875)	1,647 (83)	790	89
Totals	2,105	307	639	36	30,685 (1,256)	1,660 (83)	1,029	106

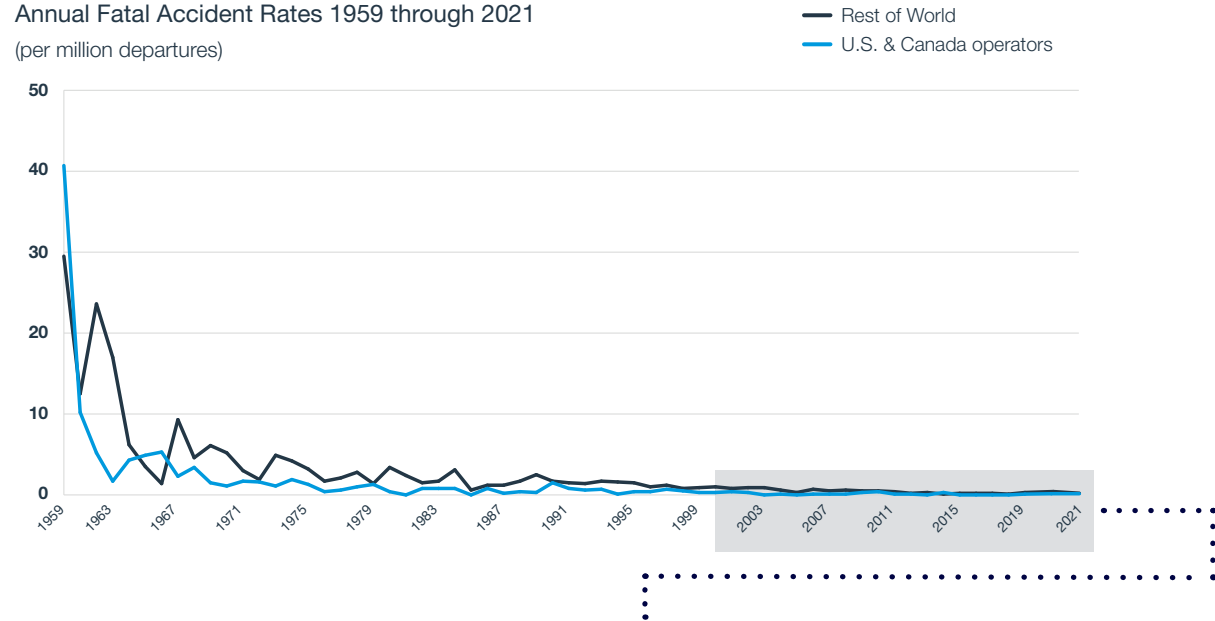
* External fatalities include on-ground fatalities as well as fatalities on other aircraft involved.

U.S. and Canadian Operator Accident Rates by Year

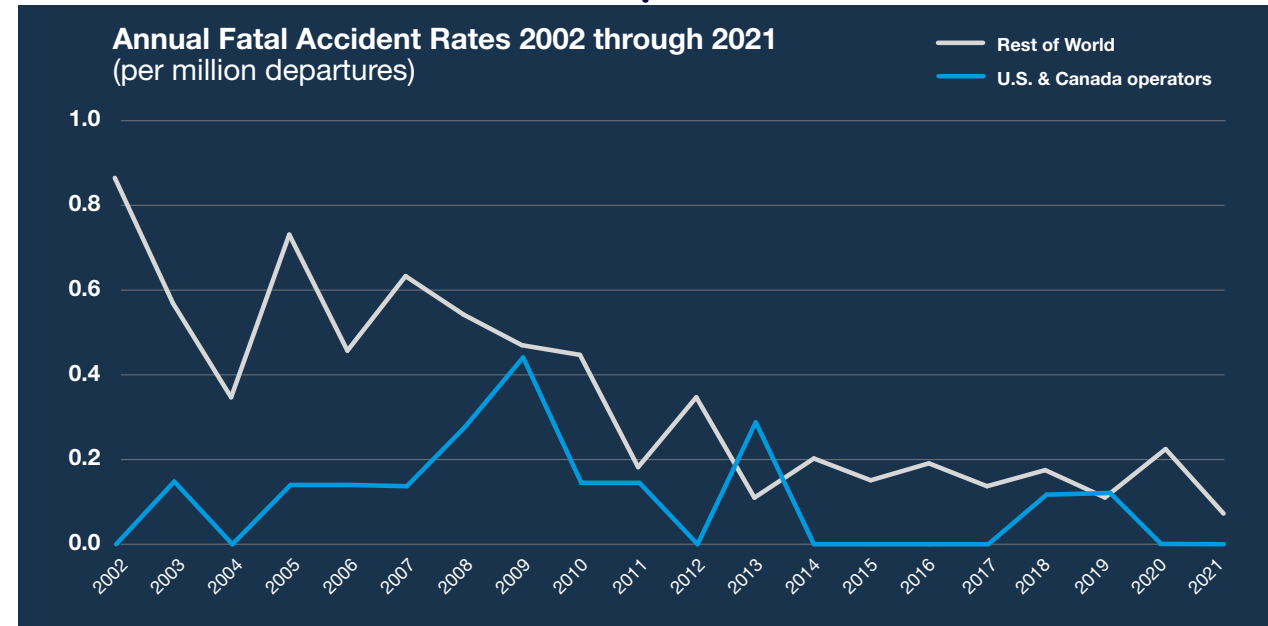
Worldwide Commercial Jet Fleet 2002 through 2021

The first decade of the jet age saw dramatic improvements in fatal accident rates. Since then, safety advancements across the industry have helped continue the downward trend. In 2021, fatal accident rates were lower than 20 years ago.

Annual Fatal Accident Rates 1959 through 2021
(per million departures)



Annual Fatal Accident Rates 2002 through 2021
(per million departures)

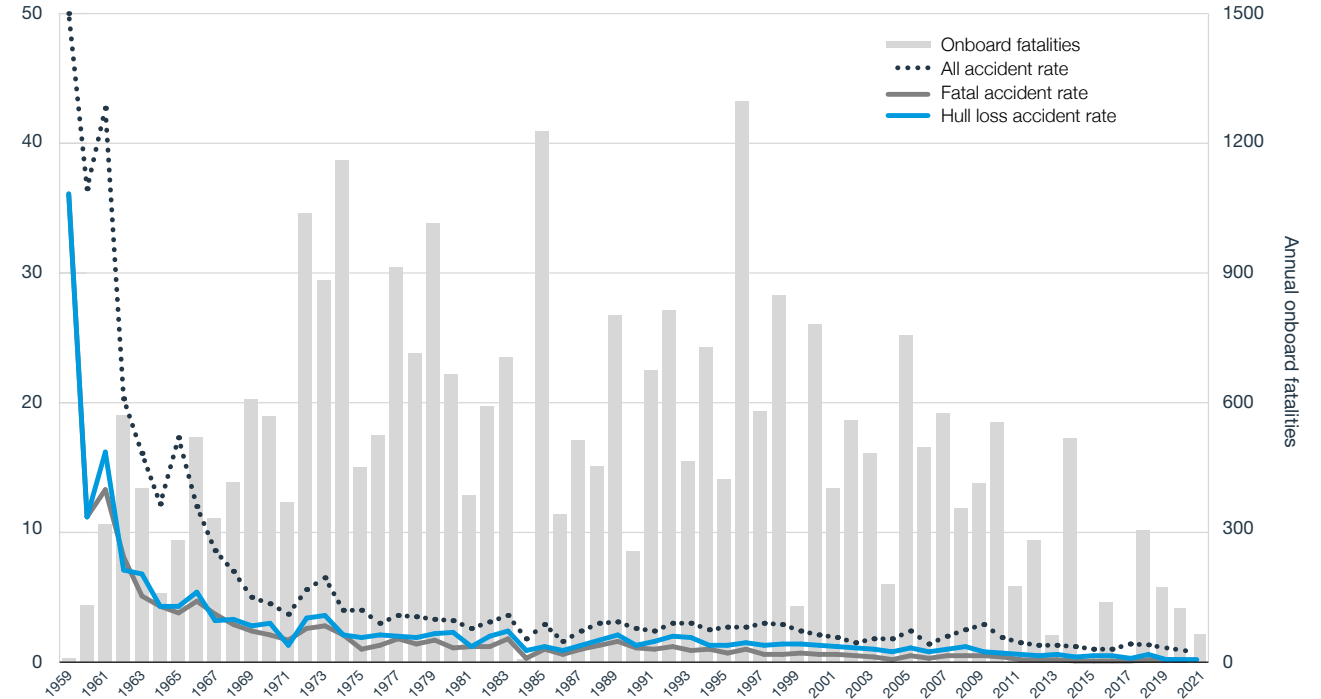


Accident Rates and Onboard Fatalities by Year

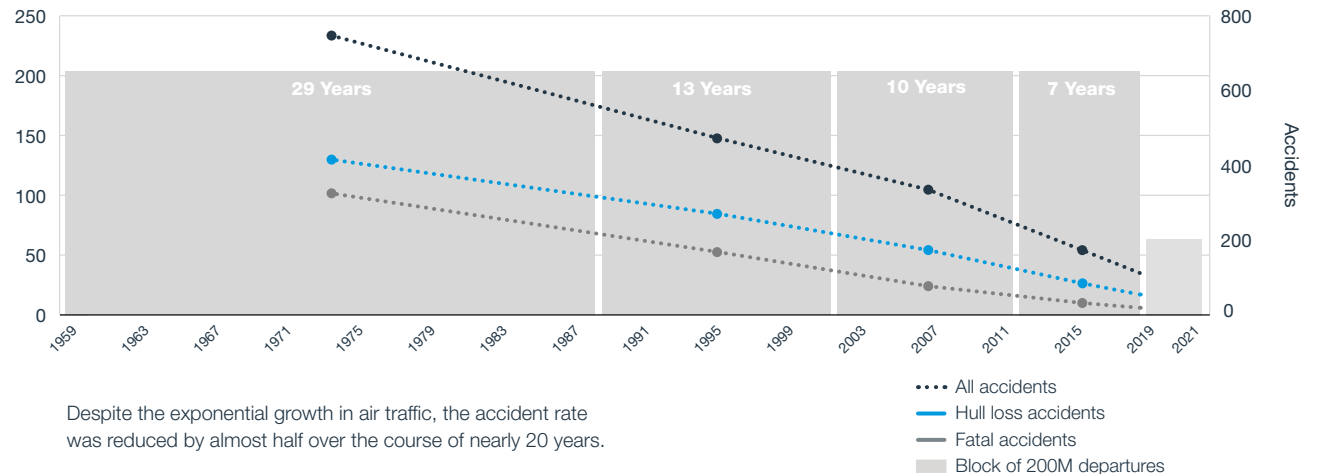
Worldwide Commercial Jet Fleet 1959 through 2021

Comparing accident rates against departures is a meaningful way to measure advancements in aviation safety. Over the past 63 years, hull losses and onboard fatalities declined dramatically while the number of flights continued to increase.

Accident Rates and Onboard Fatalities per One Million Departures



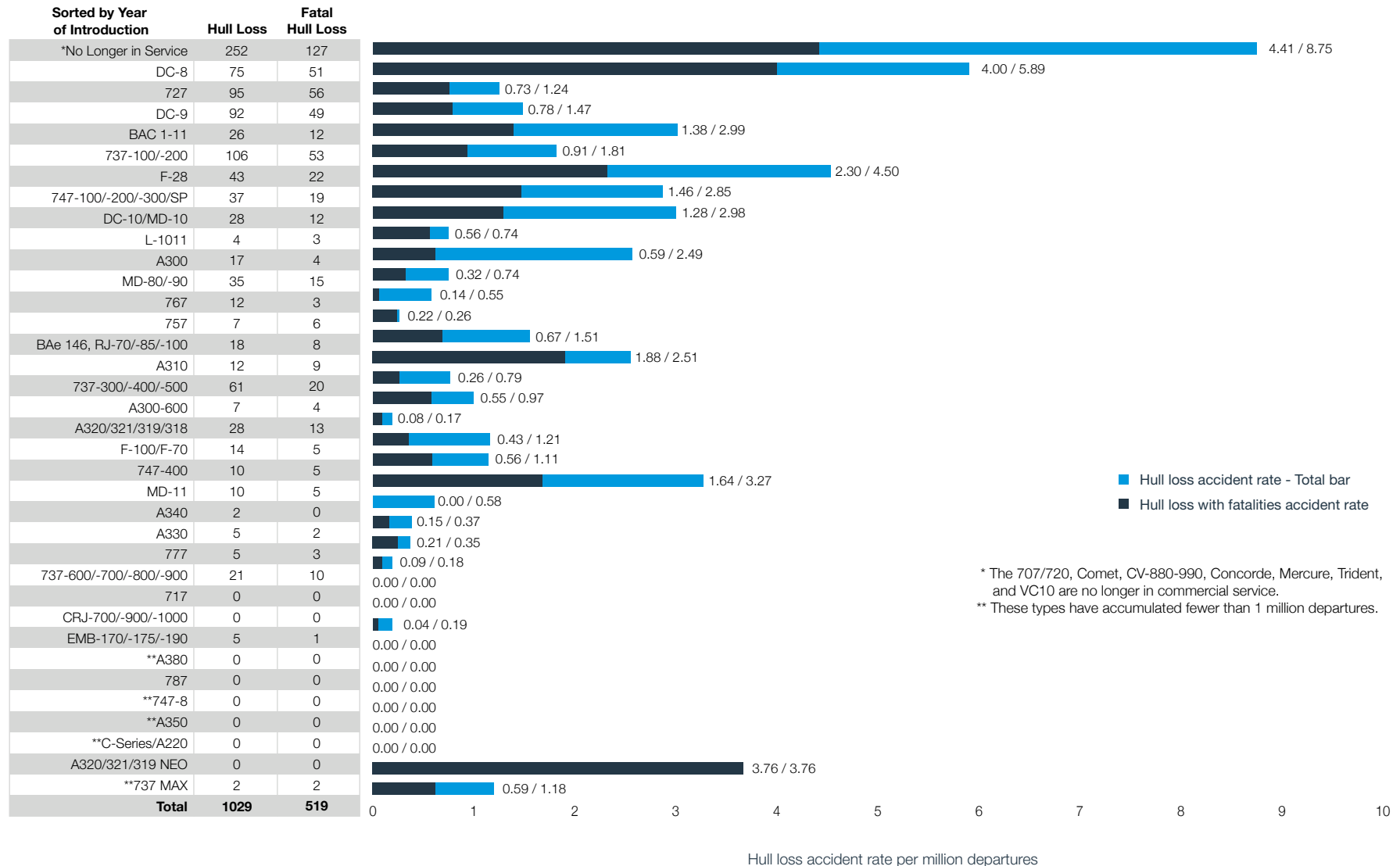
Accident Rates and Onboard Fatalities per 200 Million Departures



Despite the exponential growth in air traffic, the accident rate was reduced by almost half over the course of nearly 20 years.

Accident Rates by Airplane Type

Hull Loss Accidents | Worldwide Commercial Jet Fleet | 1959 – 2021



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.

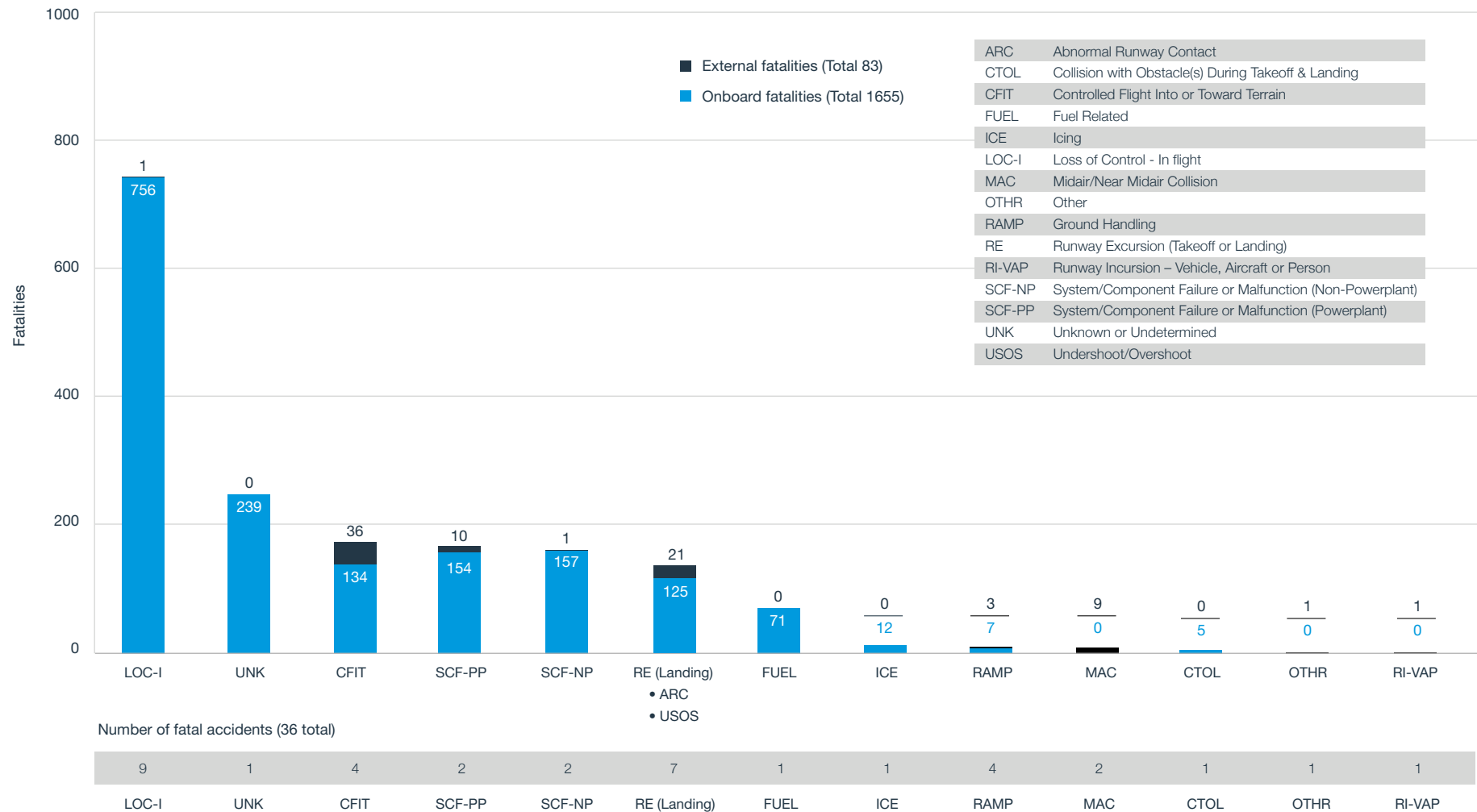
In a separate activity, the CAST assigned each fatal accident to a single principal category. Those accident assignments and a brief description of the categories are reported in the following chart.

The CASTs 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 the 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 | 2012 through 2021



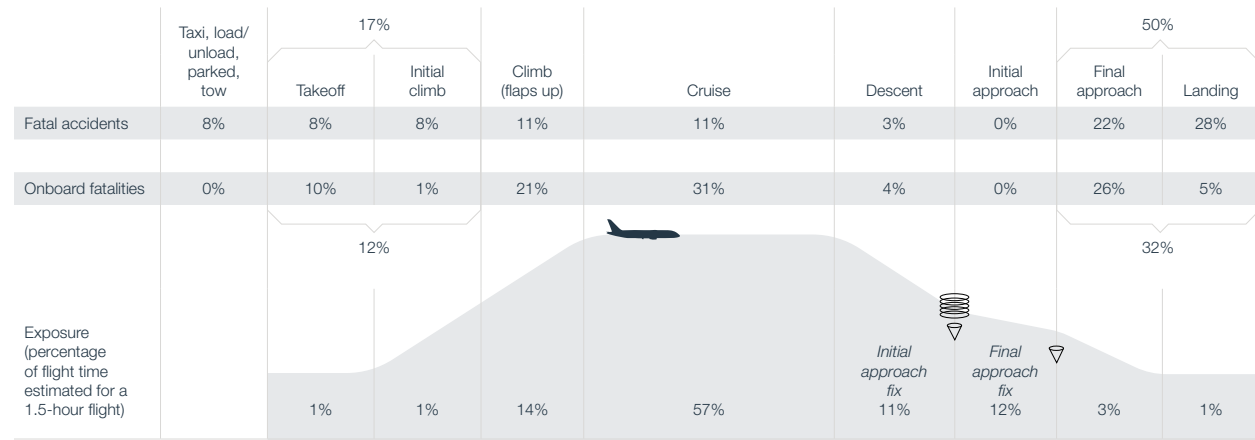
Note: Principal categories as assigned by CAST.
For a complete description of CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories, go to www.intlaviationstandards.org.

Fatal Accidents and Fatalities by Phase of Flight

Worldwide Commercial Jet Fleet 2012 through 2021

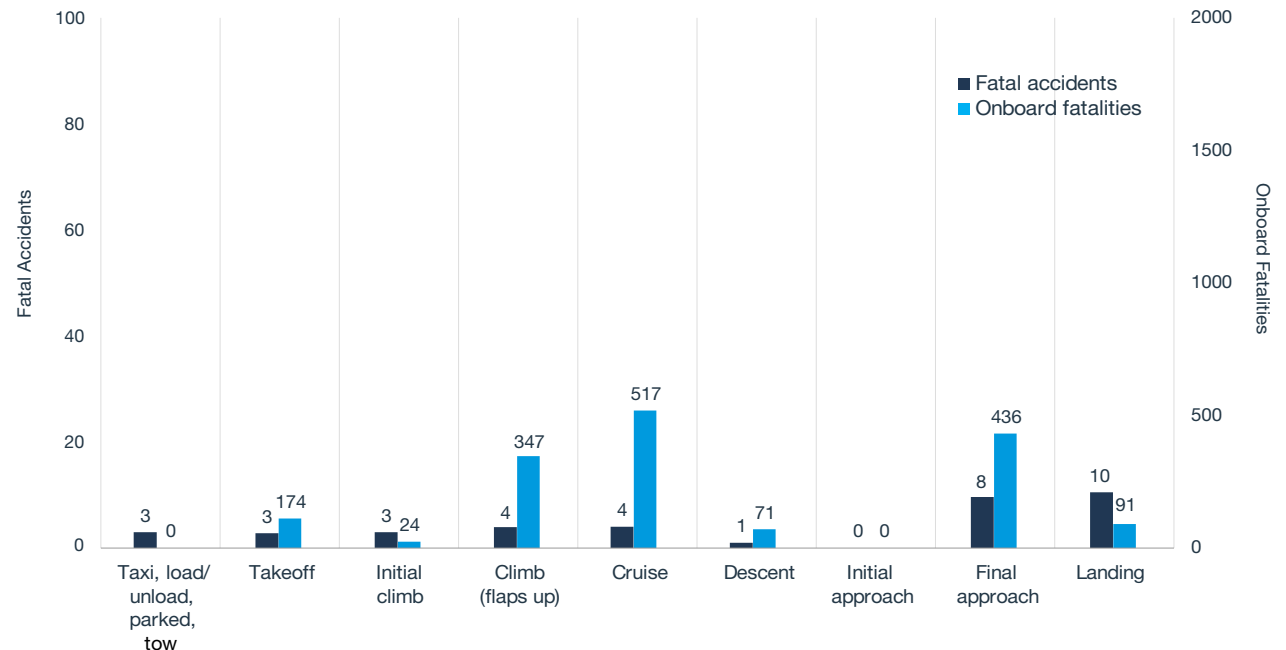
While cruising at altitude makes up the majority of time in the air, this phase of flight accounts for 11 percent of all fatal accidents. Conversely, over half of all fatal accidents occur during final approach and landing. Most safety-related improvements over the past few decades have focused on taxiing, climbing, approach, and landing phases.

Percentage of fatal accidents and onboard fatalities | 2012 through 2021



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

Distribution of fatal accidents and onboard fatalities | 2012 through 2021



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
777		A350			F100	(Convair)
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 the 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 non-fatal injuries from natural causes.
- Fatal and non-fatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and non-fatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Non-fatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Non-fatal 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 Definition” 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 non-fatal injuries from atmospheric turbulence, normal maneuvering, etc.; non-fatal 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 the 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.

Exclusions*

Excluded Airplanes

Airplanes manufactured in the CIS, USSR, or the 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 non-fatal injuries from natural causes.
- Fatal and non-fatal self-inflicted injuries or injuries inflicted by other persons.
- Fatal and non-fatal injuries of stowaways hiding outside the areas normally available to the passengers and crew.
- Non-fatal injuries resulting from atmospheric turbulence, normal maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing.
- Non-fatal 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 an SMS as follows:

An 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.”

Notes

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STATISTICAL SUMMARY 2021