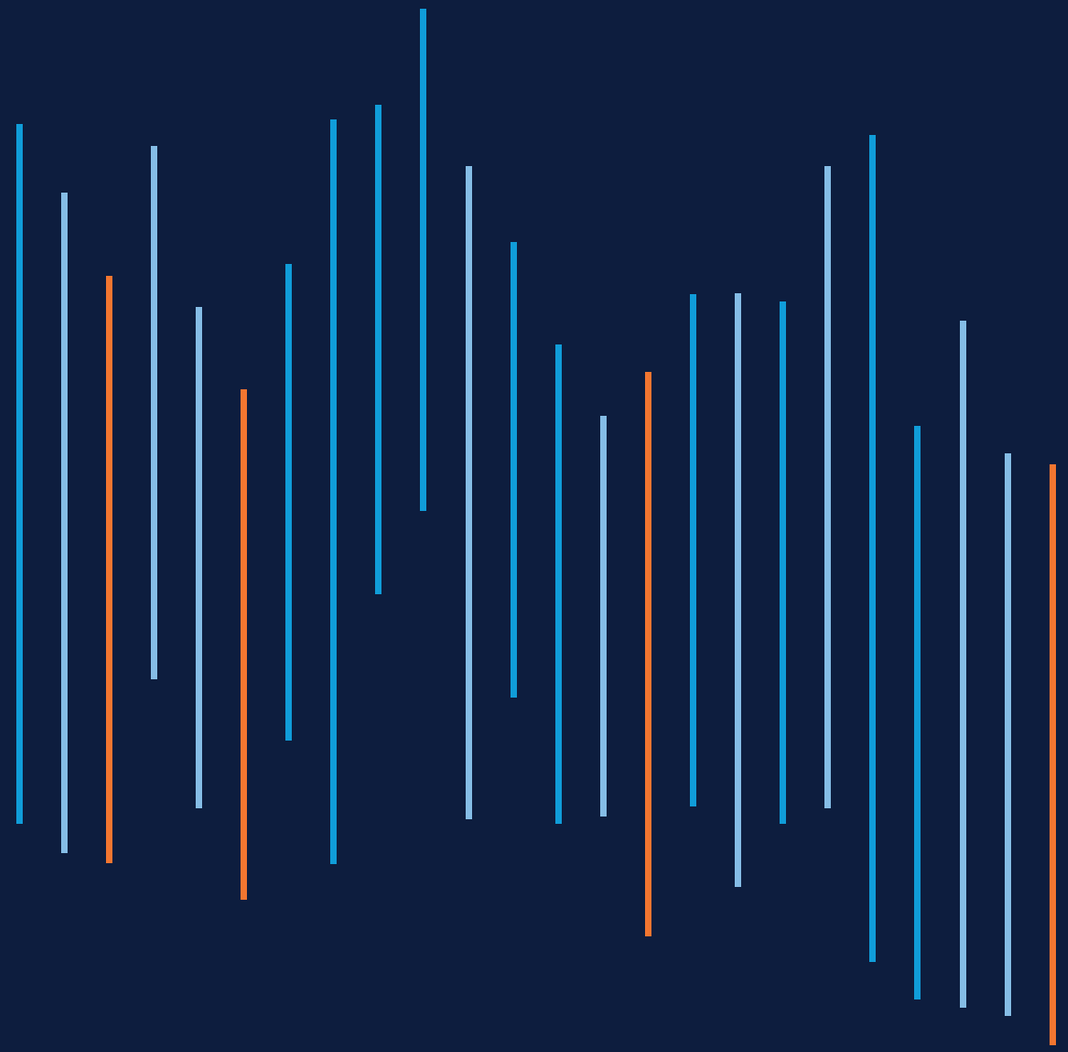
The Boeing Company

Statistical Summary of Commercial Jet Airplane Accidents

Worldwide Operations | 1959-2024

April 2025



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Leadership Message

Elisabeth Martin

Vice President, Enterprise Safety and Mission Assurance
Safety, Security & Airworthiness

The year 2024 was a reminder of why the aviation industry must remain vigilant about consistent, long-term safety advancements, no matter what progress has been achieved in the past.

Despite 2023 being one of the safest years in aviation on record, 2024 saw an increase in accidents, as tracked in this 56th edition of the Statistical Summary of Commercial Jet Airplane Accidents.

With passenger air travel at all-time highs, having surpassed previous pre-pandemic records, our industry saw a total of 47 accidents, including 12 hull losses, multiple flights with serious injuries and 187 total fatalities.

Our industry pays respect to those affected by tragedy by learning from accidents and making changes designed to prevent them in the future.

A look across decades of air travel shows what can be achieved when we remain focused on plans, processes and policies designed to improve aviation safety. Over the past two decades alone, the industry has seen a 40% decline in the total accident rate and a 65% decline in the fatal accident rate — all while departures have increased by more than 20%.

To continue those trends, it takes all of us working together, within our own organizations as well as outside of our walls. At Boeing, we're focused on:

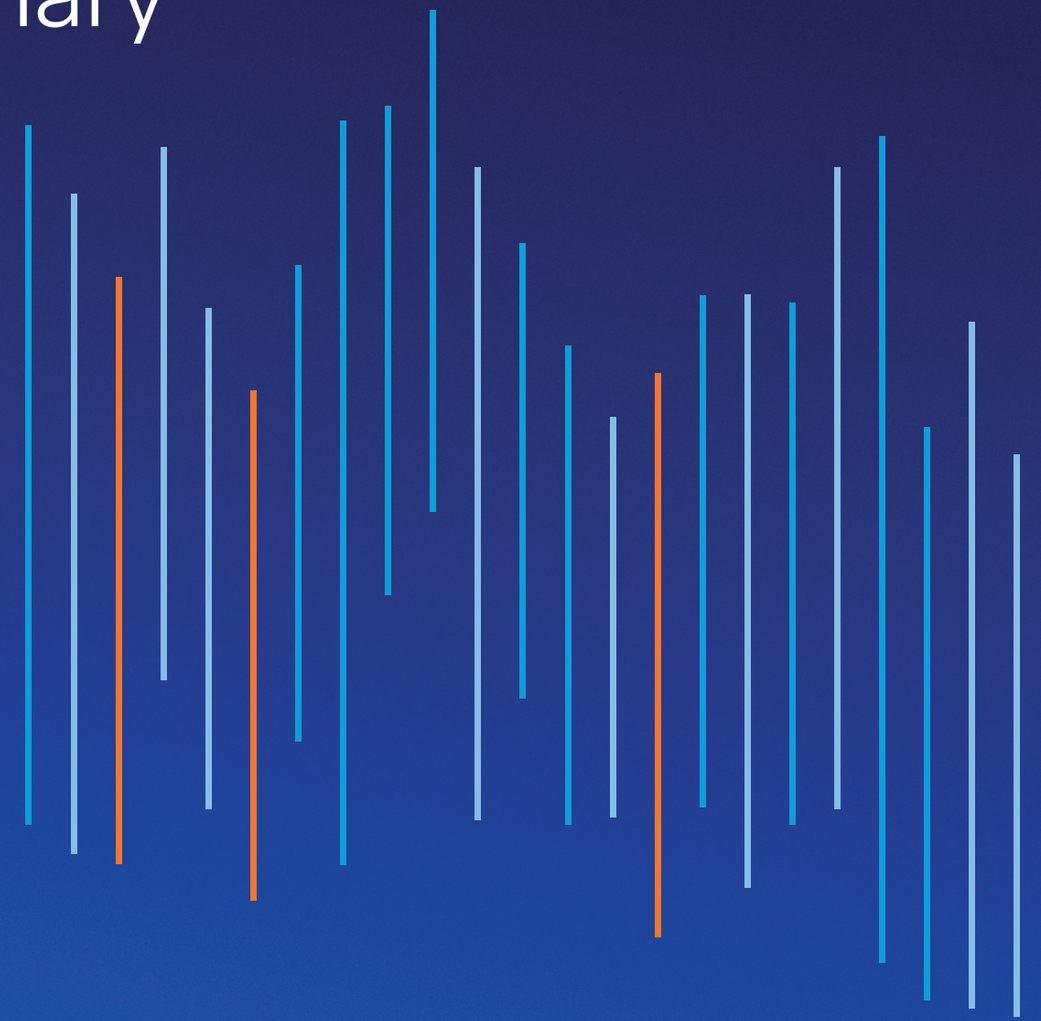
- **Implementing Our Safety & Quality Plan:** Work is underway with oversight from our regulator in four focus areas: investing in workforce training, simplifying plans and processes, eliminating defects, and elevating our safety and quality culture. We have trained employees and managers about fundamental concepts like Positive Safety Culture and identifying hazards to product safety. We also continue to act on product safety concerns raised through our Speak Up reporting channel, which we recently updated to improve the user experience.
- **Advancing Safety Practices:** We continue to mature our enterprise Safety Management System to identify hazards, assess risks and develop mitigation actions across our design, build and support operations. We also have focused efforts to apply data analytics throughout our safety work, increase the rigor of our engineering practices and ensure operational data informs our engineering designs.
- **Creating Safety Collaborations:** From hosting our own annual safety conference to supporting partnerships and training with our commercial airline customers, pilots and mechanics, we remain focused on strengthening the entire global safety ecosystem.

We are grateful for those across our industry who join us in learning lessons from the past, sharing best practices and taking proactive measures to keep aviation the safest form of transportation.

2024 Statistical Summary

This is the 56th 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.



2024 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
1/2/24	Japan Airlines	A350-900 (2)	Sched Pax	Tokyo, Japan	Landing	The airplane collided with a DHC-8 on the runway during landing and resulted in a postimpact fire. The airplane was destroyed and there were five fatalities on the DHC-8.	Destroyed	X	Fatal	0/379 (5)	X
1/5/24	Alaska Airlines	737-9 (0)	Sched Pax	Portland, United States	Climb	While climbing, the left mid-exit door plug departed the airplane leading to a rapid decompression. Minor injuries were reported.	Substantial				
1/5/24	Flybondi	737-800 (18)	Sched Pax	Mar del Plata, Argentina	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
1/10/24	United Airlines	737-900ER (9)	Sched Pax	Houston, United States	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
1/17/24	Condor	A320 (20)	Sched Pax	Munich, Germany	Parked	A ground vehicle collided with the airplane, and the airplane was substantially damaged. There were no injuries reported.	Substantial				
1/21/24	Air France	A350-900 (3)	Sched Pax	Toronto, Canada	Landing	The airplane sustained a tail strike after landing during go-around and received substantial damage. There were no injuries reported.	Substantial				
2/8/24	JetBlue Airways	A321 (8)	Sched Pax	Boston, United States	Parked	The airplane was involved in a ground collision with another airplane and was substantially damaged. There were no injuries reported.	Substantial				
2/9/24	African Express Airways	MD-82 (39)	Charter Pax	Malakal, South Sudan	Landing	The airplane was destroyed after touching down short of the runway during landing. There were no injuries reported.	Destroyed	X			X
2/9/24	European Air Transport Leipzig	A300-600 (18)	Sched Cargo	Leipzig, Germany	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
2/18/24	Marathon Airlines	ERJ 195 (15)	Sched Pax	Belgrade, Serbia	Takeoff	The airplane collided with approach lights during takeoff. There were no injuries reported.	Substantial	X			
3/8/24	United Airlines	737-8 (4)	Sched Pax	Houston, United States	Landing	The airplane experienced a runway excursion. The left main landing gear separated and the airplane was substantially damaged. There were no injuries reported.	Substantial				
3/11/24	LATAM Airlines Group	787-9 (8)	Sched Pax	Auckland, New Zealand	Cruise	The airplane experienced a sudden descent while in cruise before normal flight resumed. There were two serious injuries reported.	None		Serious		
3/23/24	ABX Air	767-300 (32)	Sched Cargo	Panama City, Panama	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial	X			
3/31/24	Safe Air	727-200 (44)	Charter Cargo	Malakal, South Sudan	Landing	The airplane touched down short of the runway during landing and veered off into soft ground, striking an MD-82 from a prior accident on 2/9. Minor injuries were reported.	Destroyed	X			X
5/5/24	Serve Air	737-300 (33)	Charter Cargo	Kinshasa, Democratic Republic of Congo	Landing	The airplane experienced a runway excursion on landing and was destroyed. There were no injuries reported.	Destroyed	X			X
5/9/24	Groupe Transair SA	737-300 (30)	Sched Pax	Diass, Senegal	Takeoff	The airplane experienced a runway excursion after an aborted takeoff and was destroyed. There was one serious injury reported.	Destroyed	X	Serious		X
5/20/24	Condor	757-300 (25)	Sched Pax	Frankfurt, Germany	Taxi	The airplane stopped abruptly while taxiing. There was one serious injury reported.	None		Serious		
5/21/24	Singapore Airlines	777-300ER (16)	Sched Pax	Myaungmya, Myanmar	Cruise	The airplane encountered turbulence and one passenger fatality occurred.	Minor		Fatal	1/229 (0)	

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5/31/24	Air France	A330 (21)	Sched Pax	N'djamena, Chad	Parked	The airplane pivoted from strong winds and collided with a ground vehicle and was substantially damaged. There were no injuries reported.	Substantial				
6/4/24	Bangkok Airways	A319 (15)	Sched Pax	Koh Samui, Thailand	Parked	The airplane collided with an airport wall and was substantially damaged. There were no injuries reported.	Substantial				
6/9/24	Austrian Airlines	A320 (22)	Sched Pax	Vienna, Austria	Cruise	The airplane encountered a severe hailstorm while in flight and was substantially damaged. There were no injuries reported.	Substantial				
6/27/24	Marabu Airlines	A320NEO (8)	Sched Pax	Munich, Germany	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
7/16/24	Spirit Airlines	A320 (9)	Sched Pax	Orlando, United States	Taxi	The airplane stopped abruptly while taxiing. There was one serious injury reported.	None		Serious		
8/18/24	Smart Avia	737-800 (20)	Sched Pax	Sochi, Russia	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
8/23/24	Ariana Afghan Airlines	737-400 (31)	Sched Pax	Khost, Afghanistan	Takeoff	The airplane sustained a tail strike, overran the runway and contacted a fence during takeoff, resulting in substantial damage. There were no injuries reported.	Substantial				
8/24/24	Condor	757-300 (24)	Sched Pax	Palma de Mallorca, Spain	Parked	While the aircraft was parking, a ground crew member was seriously injured from the airplane's jet blast.	None		Serious		
8/27/24	DHL	767-300 (21)	Charter Cargo	Milan, Italy	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
8/31/24	Virgin Atlantic Airways	A350-1000 (5)	Sched Pax	Atlanta, United States	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. There were no injuries reported.	Substantial				
8/31/24	Delta Air Lines	A330 (20)	Sched Pax	Atlanta, United States	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. There were no injuries reported.	Substantial				
9/9/24	IndiGo	A321NEO (2)	Sched Pax	Bangalore, India	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
9/10/24	Endeavor Air	CRJ 900 (11)	Sched Pax	Atlanta, United States	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. Minor injuries were reported.	Substantial				
9/10/24	Delta Air Lines	A350-900 (7)	Sched Pax	Atlanta, United States	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. Minor injuries were reported.	Substantial				
9/11/24	Air Transat	A330 (17)	Sched Pax	Paris, France	Taxi	The airplane was involved in a ground collision with another airplane and was substantially damaged. There were no injuries reported.	Substantial				
9/15/24	Sunclass Airlines	A321 (9)	Sched Pax	Skiathos, Greece	Landing	The airplane experienced a hard landing and was substantially damaged. There were no injuries reported.	Substantial				
9/19/24	United Airlines	757-200 (26)	Sched Pax	Wyoming, United States	Cruise	The airplane responded to a TCAS resolution advisory while at cruise, resulting in two reported serious injuries.	None		Serious		
9/24/24	Brussels Airlines	A320 (18)	Sched Pax	Brussels, Belgium	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
10/18/24	Turkish Airlines	A321NEO (2)	Sched Pax	Dublin, Ireland	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				

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10/29/24	UPS	A300-600 (20)	Charter Cargo	Louisville, United States	Landing	The airplane sustained a tail strike during landing and received substantial damage. There were no injuries reported.	Substantial				
11/9/24	Total Linhas Aereas	737-400 (31)	Sched Cargo	Sao Paulo, Brazil	Cruise	While in flight, fire was detected at the main cargo deck and the airplane was destroyed by the fire after landing. There were no injuries reported.	Destroyed	X			X
11/19/24	Cargojet Airways Ltd.	767-300F (30)	Sched Cargo	Vancouver, Canada	Landing	The airplane departed the runway on landing, colliding with numerous approach lights and was substantially damaged. There were no injuries reported.	Substantial				
11/21/24	SAS	A330 (22)	Sched Pax	Stockholm, Sweden	Takeoff	The airplane sustained a tail strike during takeoff and received substantial damage. There were no injuries reported.	Substantial				
11/21/24	SWISS	A220-300 (7)	Sched Pax	Brussels, Belgium	Tow	The airplane was involved in a ground collision with a tow truck and was substantially damaged. There were no injuries reported.	Substantial				
11/25/24	Swiftair	737-400 (31)	Charter Cargo	Vilnius, Lithuania	Final Approach	While on approach to land, the airplane collided with terrain and was destroyed. There was one fatality.	Destroyed	X	Fatal	1/4 (0)	X
11/27/24	Nolinor Aviation	737-400 (35)	Sched Pax	Montreal, Canada	Landing	The airplane's landing gear collapsed during landing and resulted in a hull loss. There were no injuries reported.	Substantial	X			
12/11/24	Allied Air Limited	737-400 (32)	Charter Cargo	Abuja, Nigeria	Landing	The airplane's main landing gear assembly detached after touchdown during landing. A runway excursion occurred, resulting in a hull loss. There were no injuries reported.	Substantial	X			
12/23/24	SWISS	A220-300 (7)	Sched Pax	Graz, Austria	Cruise	The airplane cabin experienced smoke while in flight. One crew member died a week after the accident.	None		Fatal	1/79 (0)	
12/29/24	Jeju Air	737-800 (15)	Sched Pax	Muan, South Korea	Landing	The airplane experienced a runway excursion after a gear up landing, and the airplane was destroyed after impacting the localizer installation. There were 179 fatalities.	Destroyed	X	Fatal	179/181 (0)	X
47	**Total Accidents**							**12**		**182 Onboard (5 External)**	**8**

Accident Rate and Departure Trends by Decade

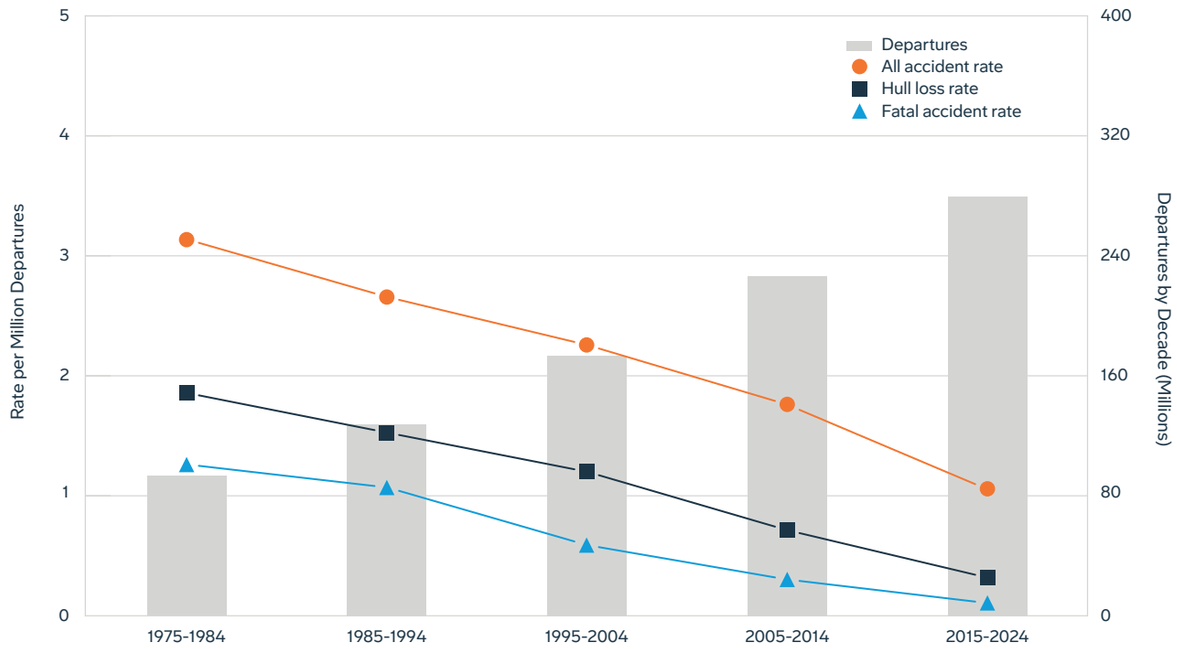
Worldwide Commercial Jet Fleet 1975-2024

Over the past five decades, statistics show that accident rates continue to decline even though air travel continues to grow worldwide. Between the last two decades, data shows the following trends:

- **Accident rate:** 40% decline
- **Hull loss rate:** 55% decline
- **Fatal accident rate:** 65% decline
- **Departures:** 23% increase

Total accident numbers are also declining, in addition to accident rates. For example, between the last two decades, total accidents dropped by about 25%; hull losses dropped by nearly 45%; and fatal accidents dropped by about 55%.

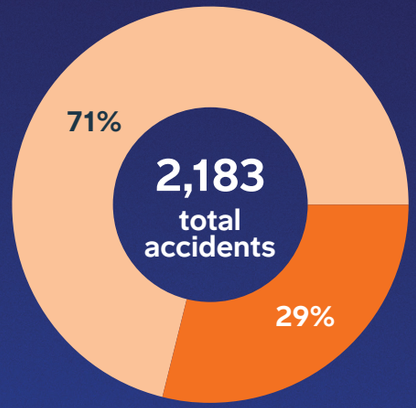
Accident Rates per One Million Departures and Total Departures, Decade View



Accident Summary by Injury and Damage

Worldwide Commercial Jet Fleet
1959-2024

1959-2024



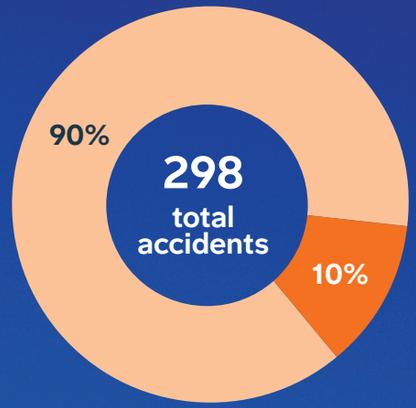
1,542 Nonfatal accidents

525 with hull loss
925 with substantial damage
92 without substantial damage

641 Fatal accidents

516 with hull loss
28 with substantial damage
97 without substantial damage

2015-2024



268 Nonfatal accidents

69 with hull loss
173 with substantial damage
26 without substantial damage

30 Fatal accidents

21 with hull loss
1 with substantial damage
8 without substantial damage

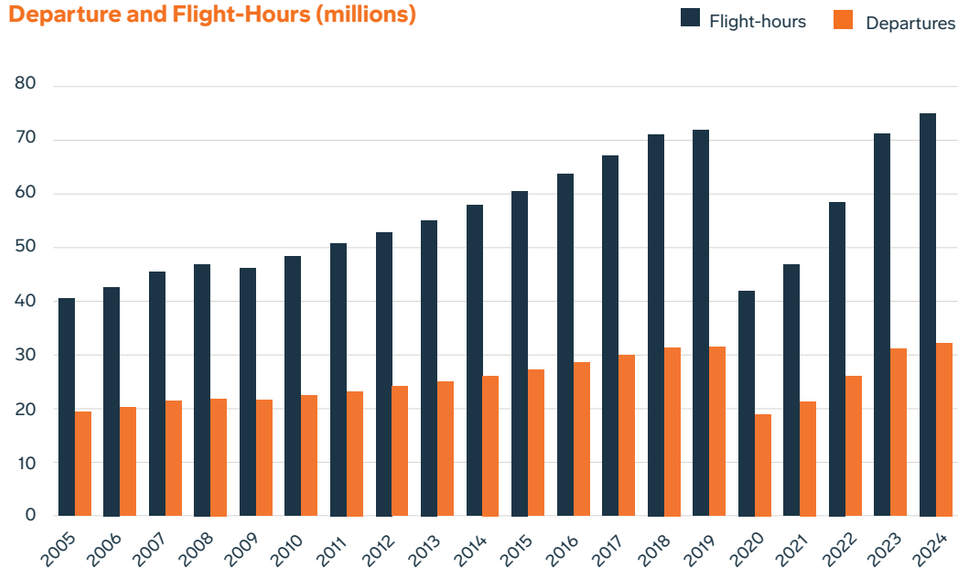
Note: "Hull loss" and the terms here refer to the severity of damage an airplane incurs from an accident.

Departures, Flight-Hours and Jet Airplanes in Service*

Worldwide Commercial Jet Fleet 2005-2024

Over the past 20 years, the statistics show a growing trend in the gap between total number of departures and total flight-hours. In 2024, passenger traffic exceeded pre-pandemic highs. The worldwide airplane fleet and commercial air traffic are expected to continue to grow over the next two decades.

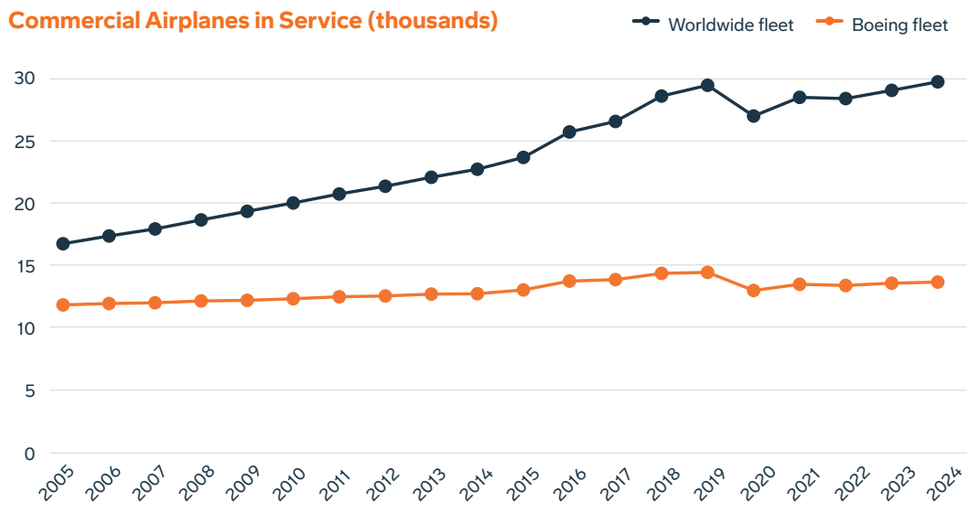
Departure and Flight-Hours (millions)



75.3 million flight-hours
1,889 million flight-hours logged since 1959. 64% of total hours logged were on Boeing flights. (1,212 million on Boeing airplanes)

32.4 million departures
965 million departures since 1959. 63% of those departures were on Boeing airplanes. (609 million on Boeing airplanes)

Commercial Airplanes in Service (thousands)



29,745
total airplanes

13,673
Boeing airplanes

Sources: 2005-2019, Jet Information Services Inc.
2020-2024, Cirium.

*Certified jet airplanes greater than 60,000 pounds (27,216 kilograms) 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/PRC-manufactured airplanes.

Accident Summary by Type of Operation

Worldwide Commercial Jet Fleet 1959-2024

Type of Operation	All Accidents		Fatal Accidents		Onboard Fatalities (External Fatalities)*		Hull Loss Accidents	
	1959-2024	2015-2024	1959-2024	2015-2024	1959-2024	2015-2024	1959-2024	2015-2024
Passenger	1,744	245	515	25	29,825 (815)	969 (23)	765	65
– Scheduled	1,618	240	468	24	25,628 (811)	898 (23)	692	62
– Charter	126	5	47	1	4,197 (4)	71 (0)	73	3
Cargo	317	52	84	5	286 (385)	13 (43)	202	24
Maintenance test, ferry, positioning, training and demonstration	122	1	42	0	190 (66)	0 (0)	74	1
Totals	**2,183**	**298**	**641**	**30**	**30,301 (1, 266)**	**982 (66)**	**1,041**	**90**

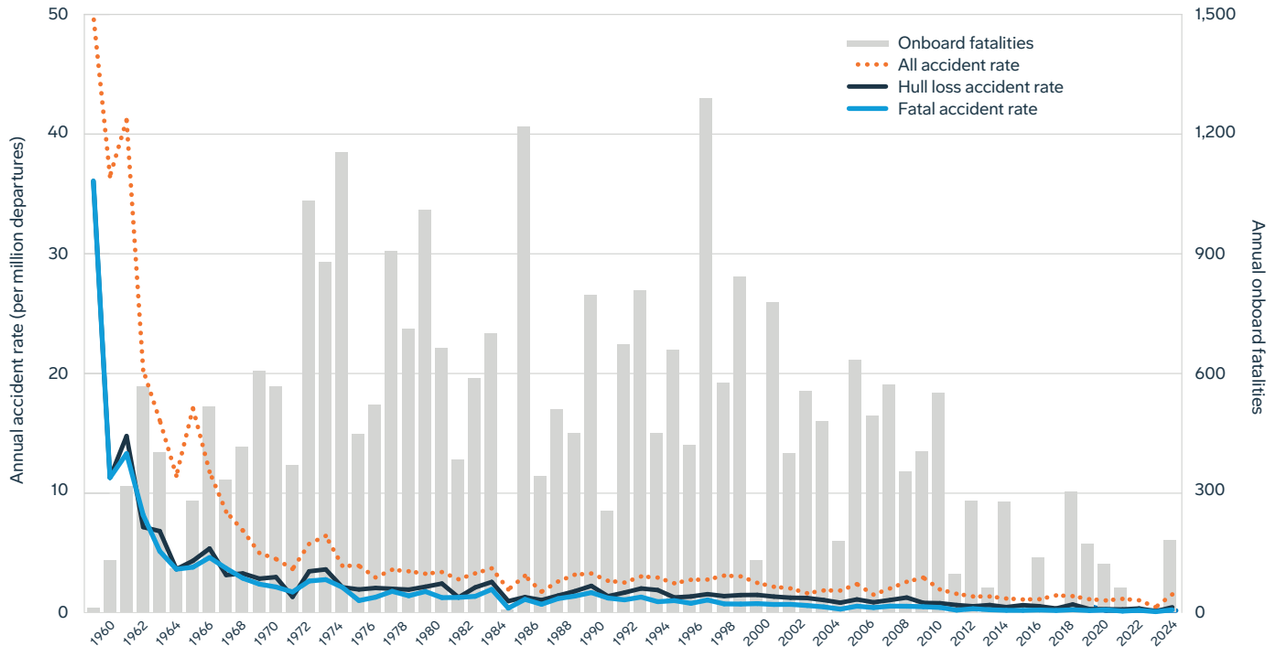
*External fatalities include on-ground fatalities as well as fatalities on other aircraft involved.

Accident Rates and Onboard Fatalities by Year

Worldwide Commercial Jet Fleet 1959-2024

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 over the decades, despite year-to-year fluctuations.

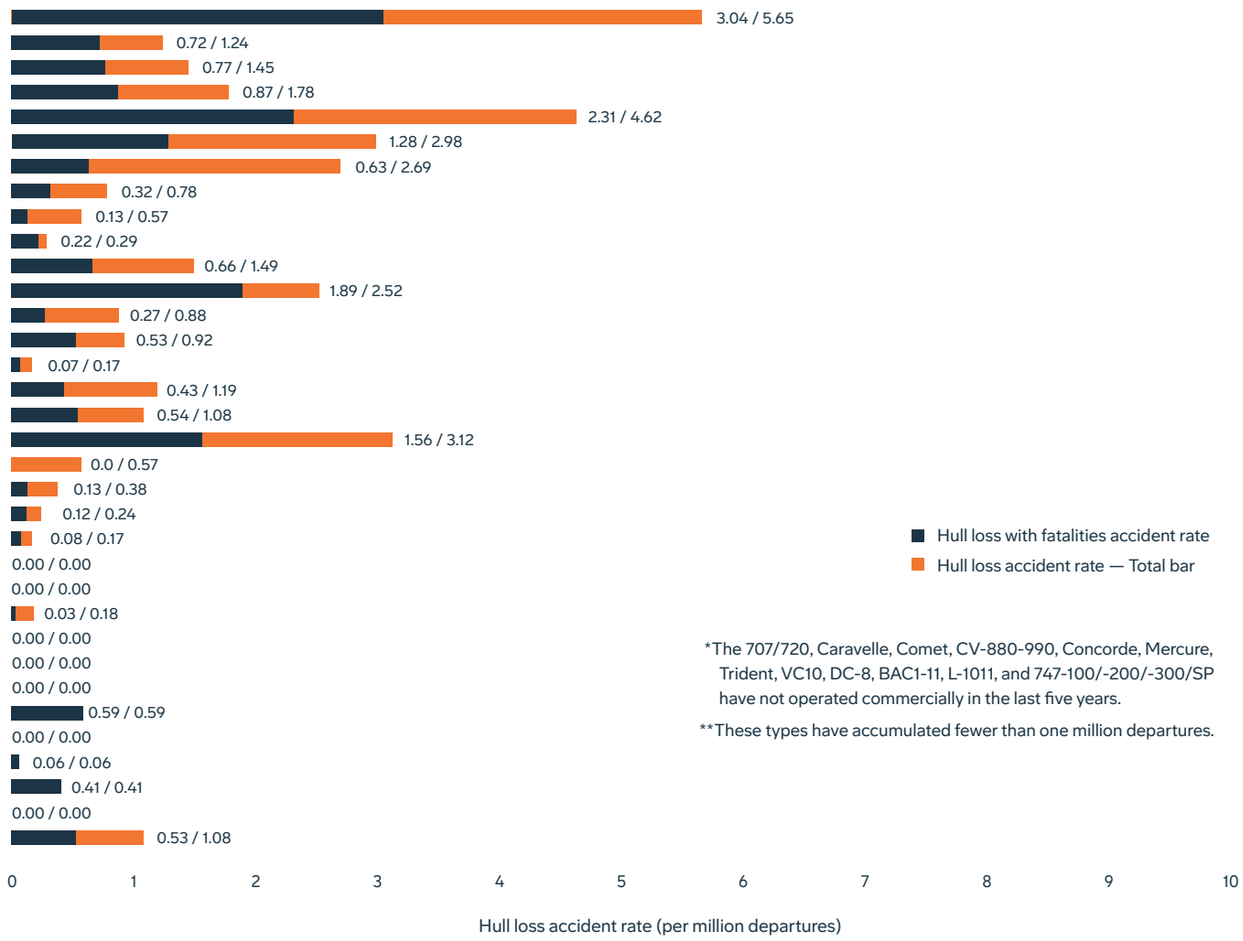
Accident Rates and Onboard Fatalities per One Million Departures



Accident Rates by Airplane Type

Hull Loss Accidents | Worldwide Commercial Jet Fleet | 1959-2024

Sorted by Year of Introduction	Hull Loss	Hull Loss With Fatalities	
*No Longer in Service	392	211	3.04 / 5.65
727	95	55	0.72 / 1.24
DC-9	91	48	0.77 / 1.45
737-100/-200	104	51	0.87 / 1.78
F-28	42	21	2.31 / 4.62
DC-10/MD-10	28	12	1.28 / 2.98
A300	17	4	0.63 / 2.69
MD-80/-90	37	15	0.32 / 0.78
767	13	3	0.13 / 0.57
757	8	6	0.22 / 0.29
BAe 146, RJ-70/-85/-100	18	8	0.66 / 1.49
A310	12	9	1.89 / 2.52
737-300/-400/-500	68	21	0.27 / 0.88
A300-600	7	4	0.53 / 0.92
A320/321/319/318	30	13	0.07 / 0.17
F-100/F-70	14	5	0.43 / 1.19
747-400	10	5	0.54 / 1.08
MD-11	10	5	1.56 / 3.12
A340	2	0	0.0 / 0.57
A330	6	2	0.13 / 0.38
777	4	2	0.12 / 0.24
737-600/-700/-800/-900	23	11	0.08 / 0.17
717	0	0	0.00 / 0.00
CRJ-700/-900/-1000	0	0	0.00 / 0.00
EMB-170/-175/-190	6	1	0.03 / 0.18
A380	0	0	0.00 / 0.00
787	0	0	0.00 / 0.00
**747-8	0	0	0.00 / 0.00
A350	1	1	0.59 / 0.59
C-Series/A220	0	0	0.00 / 0.00
A320/321/319 NEO	1	1	0.06 / 0.06
737-8/-9	2	2	0.41 / 0.41
A330 NEO	0	0	0.00 / 0.00
Total	**1,041**	**516**	0.53 / 1.08



*The 707/720, Caravelle, Comet, CV-880-990, Concorde, Mercure, Trident, VC10, DC-8, BAC1-11, L-1011, and 747-100/-200/-300/SP have not operated commercially in the last five years.

**These types have accumulated fewer than one million departures.

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; and various ICAO member 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.

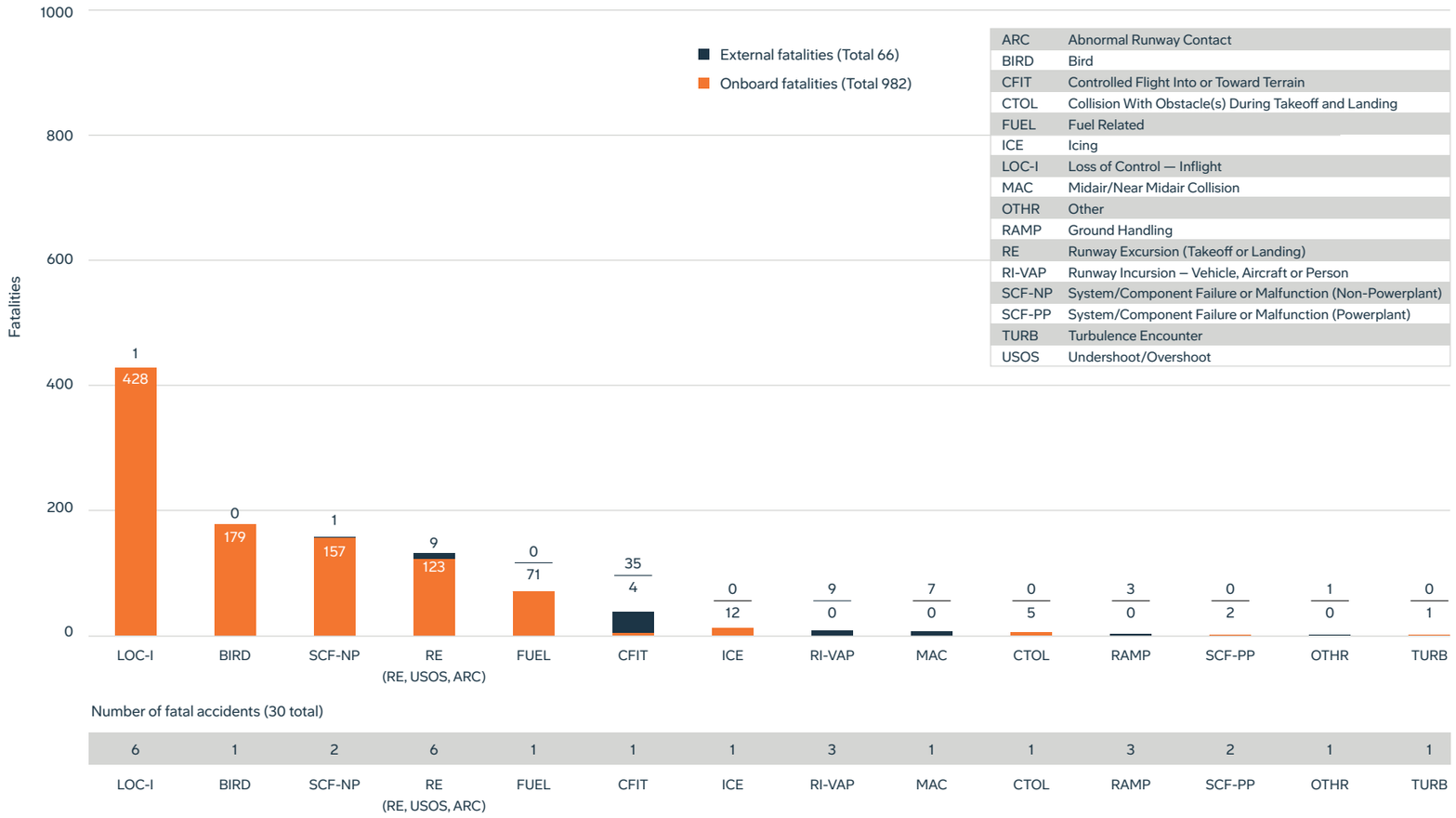
In a separate activity, the CAST assigned each fatal accident to a single principal category. Those accident assignments and a brief description of the categories are reported in the following chart.

The CAST's 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 | 2015-2024



ARC	Abnormal Runway Contact
BIRD	Bird
CFIT	Controlled Flight Into or Toward Terrain
CTOL	Collision With Obstacle(s) During Takeoff and Landing
FUEL	Fuel Related
ICE	Icing
LOC-I	Loss of Control — Inflight
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)
TURB	Turbulence Encounter
USOS	Undershoot/Overshoot

Note: Principal categories as assigned by CAST. See "Definitions and Terms" for included and excluded event details. 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 2015-2024

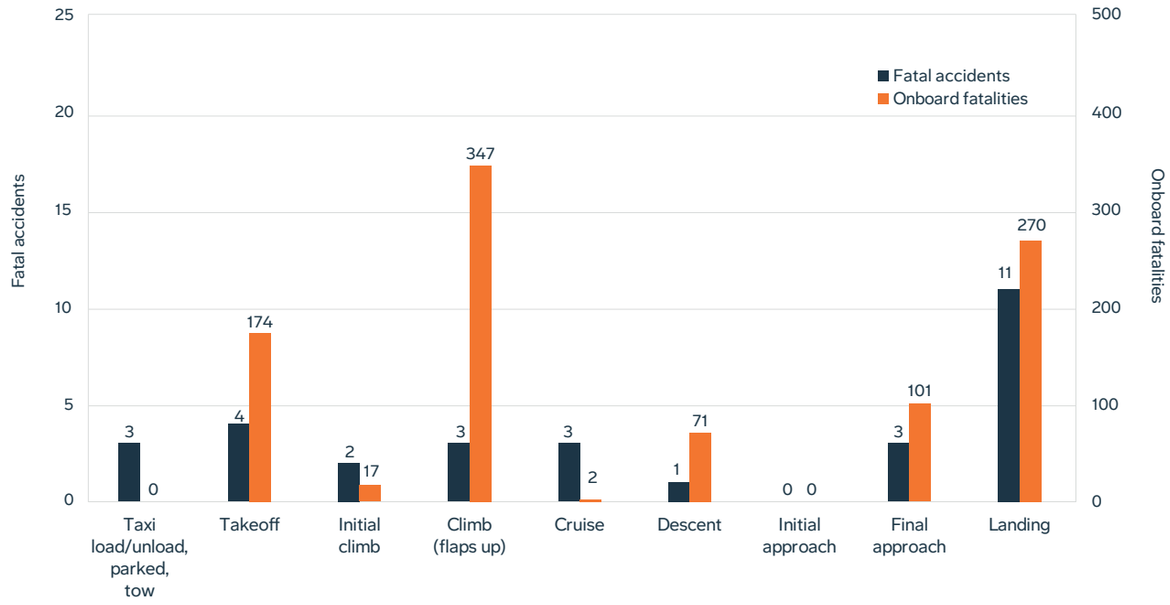
While cruising at altitude makes up the majority of time in the air, this phase of flight accounts for 10% of all fatal accidents. Conversely, the landing phase accounts for only 1% of flight time, but 37% of all fatal accidents. Most safety-related improvements over the past few decades have focused on the taxi, climb, approach and landing phases.

Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

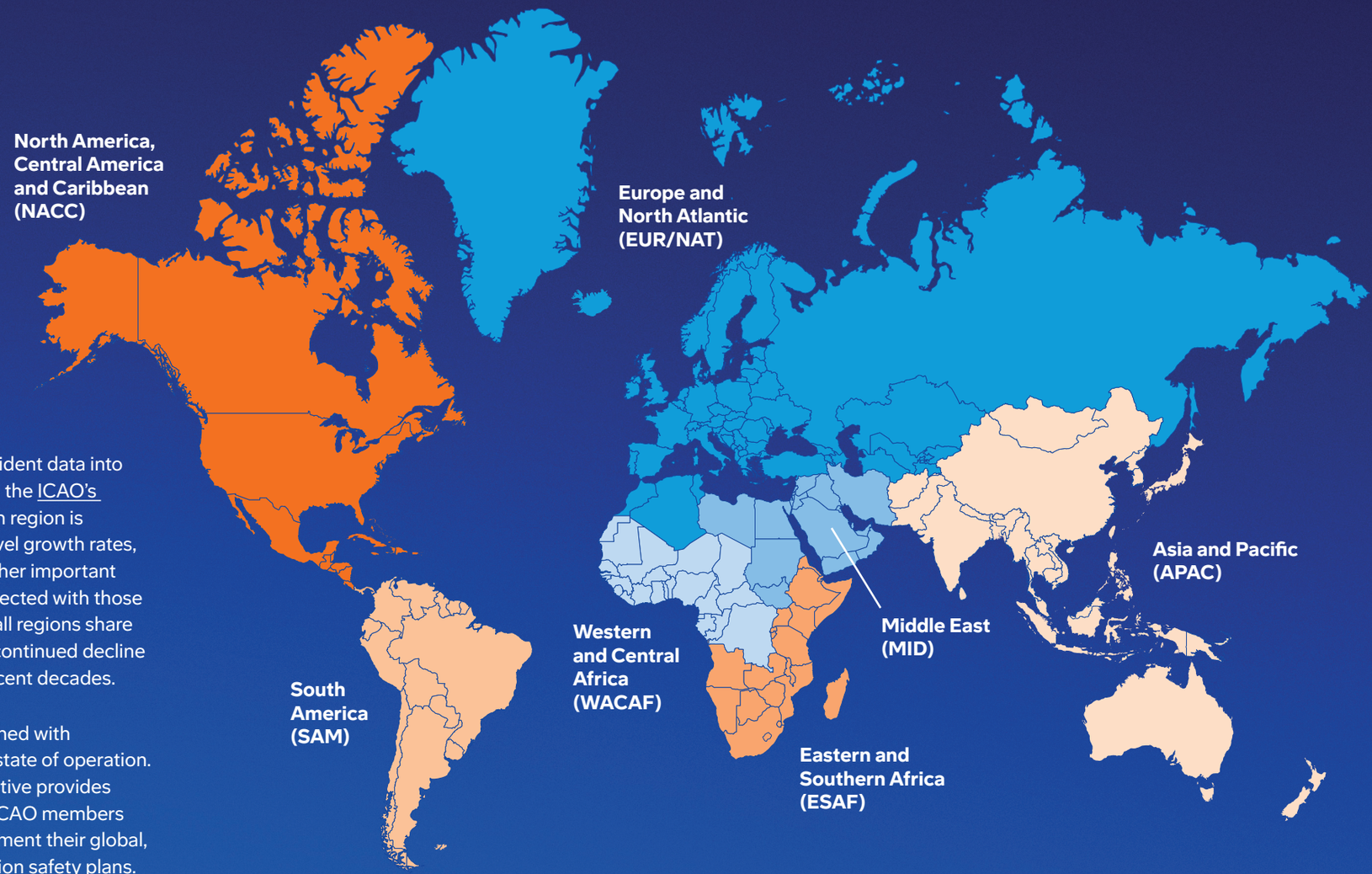
	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		20%						47%	
Fatal accidents	10%	13%	7%	10%	10%	3%	0%	10%	37%
Onboard fatalities	0%	18%	2%	35%	0%	7%	0%	10%	27%
		20%						37%	
Exposure (percentage of flight time estimated 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 | 2015-2024



Regional Statistics



This section organizes accident data into seven regions aligned with the ICAO's annual Safety Report. Each region is different in terms of air travel growth rates, operational profiles and other important factors, and the data is reflected with those factors in mind. However, all regions share one common trend – the continued decline in accident rates across recent decades.

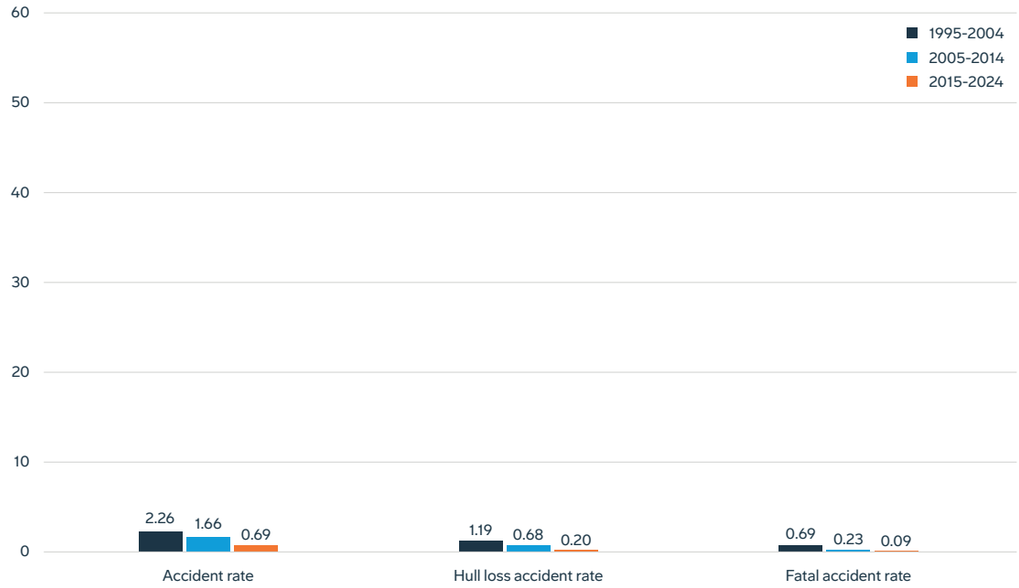
Accident statistics are aligned with operators and their home state of operation. This regional data perspective provides additional safety data for ICAO members as they develop and implement their global, regional and national aviation safety plans.

Asia and Pacific (APAC)

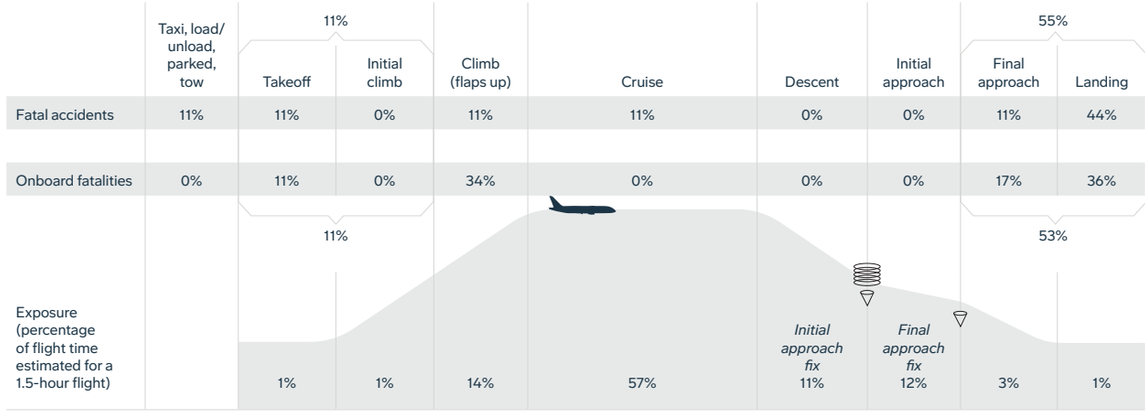
Regional Accident Counts		
APAC	1959-2024	2015-2024
All Accidents	405	64
Fatal Accidents	131	9
Onboard Fatalities	7,377	550
External Fatalities	276	7
Hull Loss Accidents	197	19

Fatal Accidents	
CICTT Category	2015-2024
BIRD	1
CFIT	0
CTOL	0
FUEL	0
ICE	0
LOC-I	2
MAC	0
OTHR	0
RAMP	1
RE (RE, USOS, ARC)	3
RI-VAP	1
SCF-NP	0
SCF-PP	0
TURB	1

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024



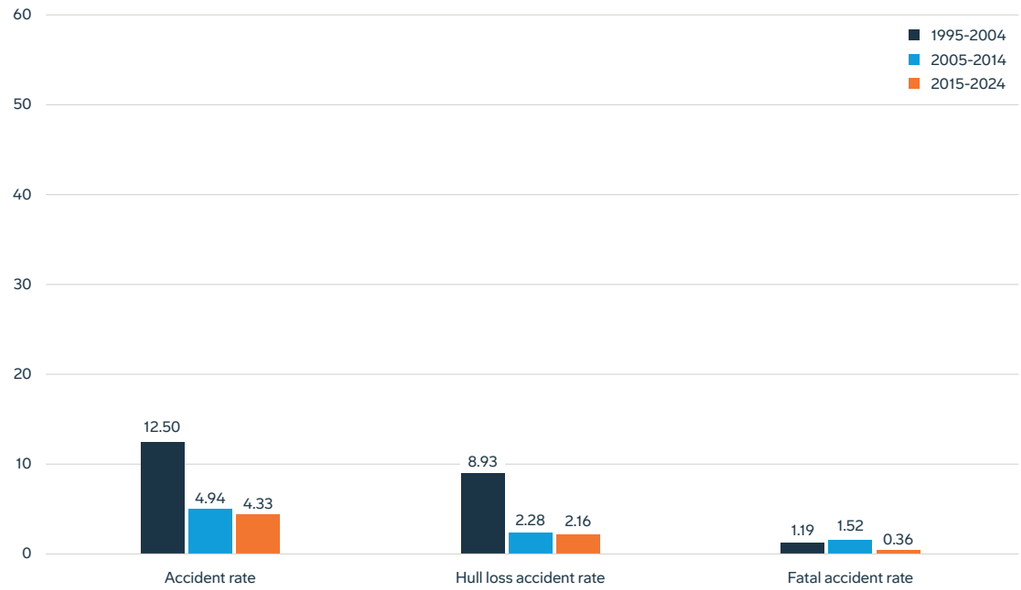
Note: Percentages may not sum to 100% because of numerical rounding.

Eastern and Southern Africa (ESAF)

Regional Accident Counts		
ESAF	1959-2024	2015-2024
All Accidents	74	12
Fatal Accidents	16	1
Onboard Fatalities	1,064	157
External Fatalities	10	0
Hull Loss Accidents	46	6

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	0
CTOL	0
FUEL	0
ICE	0
LOC-I	0
MAC	0
OTHR	0
RAMP	0
RE (RE, USOS, ARC)	0
RI-VAP	0
SCF-NP	1
SCF-PP	0
TURB	0

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		0%						0%	
Fatal accidents	0%	0%	0%	100%	0%	0%	0%	0%	0%
Onboard fatalities	0%	0%	0%	100%	0%	0%	0%	0%	0%
		0%						0%	
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%

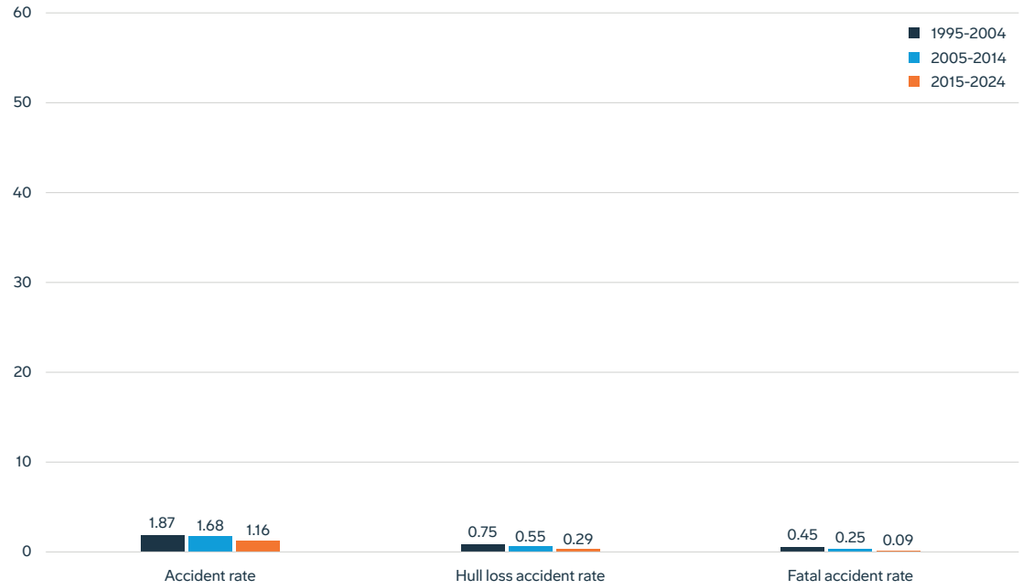
Note: Percentages may not sum to 100% because of numerical rounding.

Europe and North Atlantic (EUR/NAT)

Regional Accident Counts		
EUR/NAT	1959-2024	2015-2024
All Accidents	526	83
Fatal Accidents	144	7
Onboard Fatalities	8,071	21
External Fatalities	146	38
Hull Loss Accidents	220	21

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	1
CTOL	0
FUEL	0
ICE	1
LOC-I	0
MAC	0
OTHR	0
RAMP	1
RE (RE, USOS, ARC)	2
RI-VAP	1
SCF-NP	0
SCF-PP	1
TURB	0

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		14%						56%	
Fatal accidents	14%	0%	14%	0%	14%	0%	0%	14%	42%
Onboard fatalities	0%	0%	57%	0%	4%	0%	0%	4%	33%
		57%						37%	
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%

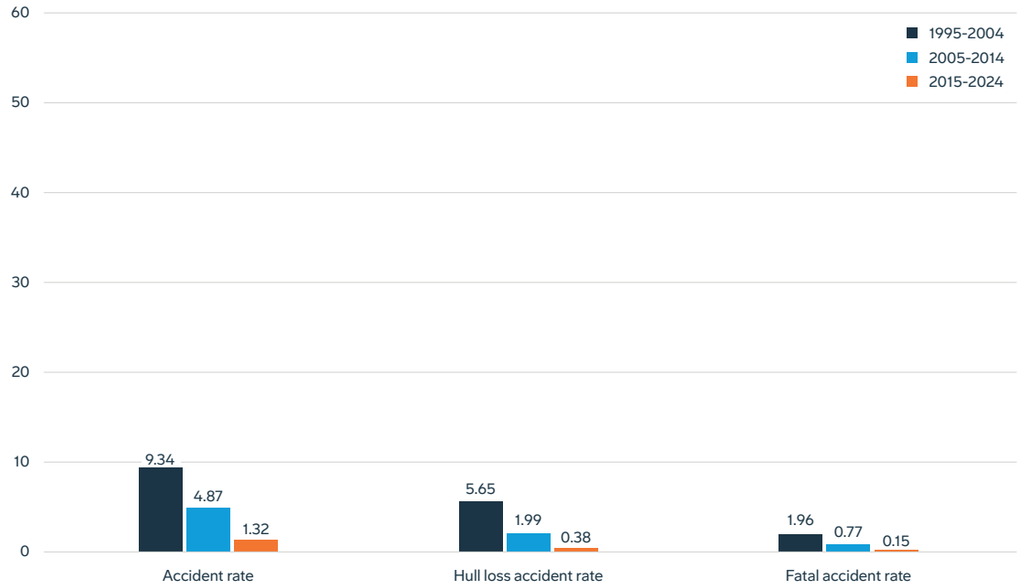
Note: Percentages may not sum to 100% because of numerical rounding.

Middle East (MID)

Regional Accident Counts		
MID	1959-2024	2015-2024
All Accidents	149	17
Fatal Accidents	41	2
Onboard Fatalities	2,353	62
External Fatalities	128	1
Hull Loss Accidents	76	5

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	0
CTOL	0
FUEL	0
ICE	0
LOC-I	2
MAC	0
OTHR	0
RAMP	0
RE (RE, USOS, ARC)	0
RI-VAP	0
SCF-NP	0
SCF-PP	0
TURB	0

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		0%						100%	
Fatal accidents	0%	0%	0%	0%	0%	0%	0%	0%	100%
Onboard fatalities	0%	0%	0%	0%	0%	0%	0%	0%	100%
		0%						100%	
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%

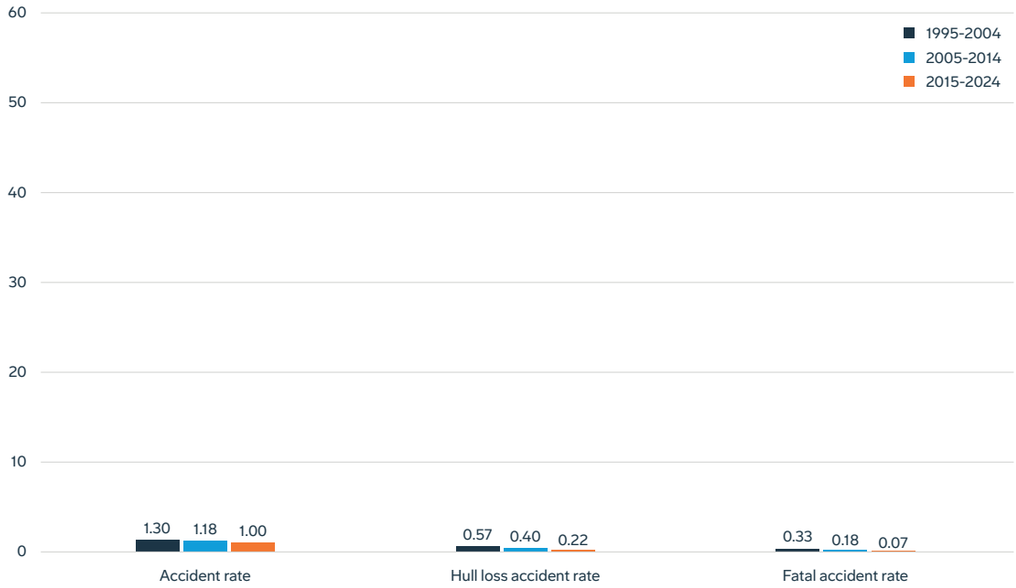
Note: Percentages may not sum to 100% because of numerical rounding.

North America, Central America and Caribbean (NACC)

Regional Accident Counts		
NACC	1959-2024	2015-2024
All Accidents	718	87
Fatal Accidents	211	6
Onboard Fatalities	7,229	116
External Fatalities	416	3
Hull Loss Accidents	283	19

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	0
CTOL	0
FUEL	0
ICE	0
LOC-I	2
MAC	0
OTHR	1
RAMP	1
RE (RE, USOS, ARC)	0
RI-VAP	0
SCF-NP	1
SCF-PP	1
TURB	0

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff (33%)	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach (32%)	Landing
Fatal accidents	16%	33%	0%	16%	0%	0%	0%	16%	16%
Onboard fatalities	0%	96%	0%	0%	0%	0%	0%	2%	0%
Exposure (percentage of flight time estimated for a 1.5-hour flight)		1% (96%)	1%	14%	57%	*Initial approach fix* 11%	*Final approach fix* 12%	3% (2%)	1%

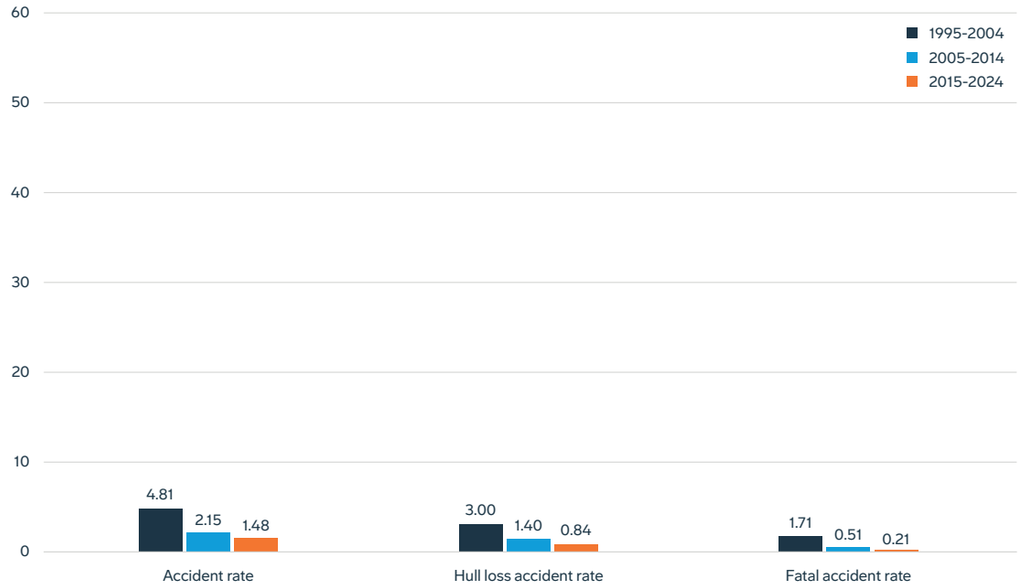
Note: Percentages may not sum to 100% because of numerical rounding.

South America (SAM)

Regional Accident Counts		
SAM	1959-2024	2015-2024
All Accidents	214	21
Fatal Accidents	74	3
Onboard Fatalities	3,250	76
External Fatalities	212	2
Hull Loss Accidents	146	12

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	0
CTOL	1
FUEL	1
ICE	0
LOC-I	0
MAC	0
OTHR	0
RAMP	0
RE (RE, USOS, ARC)	0
RI-VAP	1
SCF-NP	0
SCF-PP	0
TURB	0

Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		66%						0%	
Fatal accidents	0%	33%	33%	0%	0%	33%	0%	0%	0%
Onboard fatalities	0%	0%	6%	0%	0%	93%	0%	0%	0%
		6%						0%	
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%

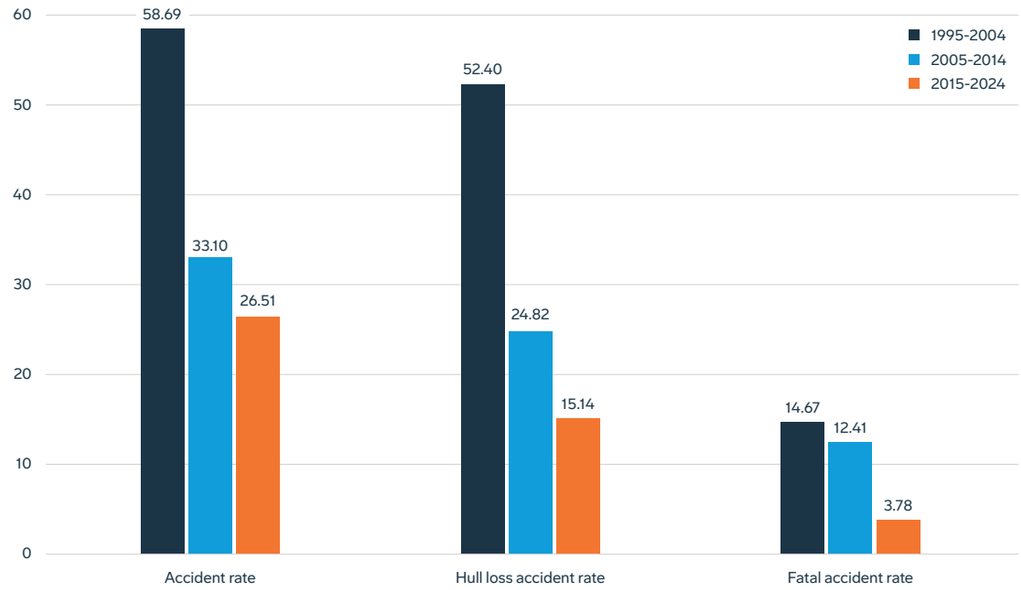
Note: Percentages may not sum to 100% because of numerical rounding.

Western and Central Africa (WACAF)

Regional Accident Counts		
WACAF	1959-2024	2015-2024
All Accidents	97	14
Fatal Accidents	24	2
Onboard Fatalities	957	0
External Fatalities	78	15
Hull Loss Accidents	73	8

Fatal Accidents	
CICTT Category	2015-2024
BIRD	0
CFIT	0
CTOL	0
FUEL	0
ICE	0
LOC-I	0
MAC	1
OTHR	0
RAMP	0
RE (RE, USOS, ARC)	1
RI-VAP	0
SCF-NP	0
SCF-PP	0
TURB	0

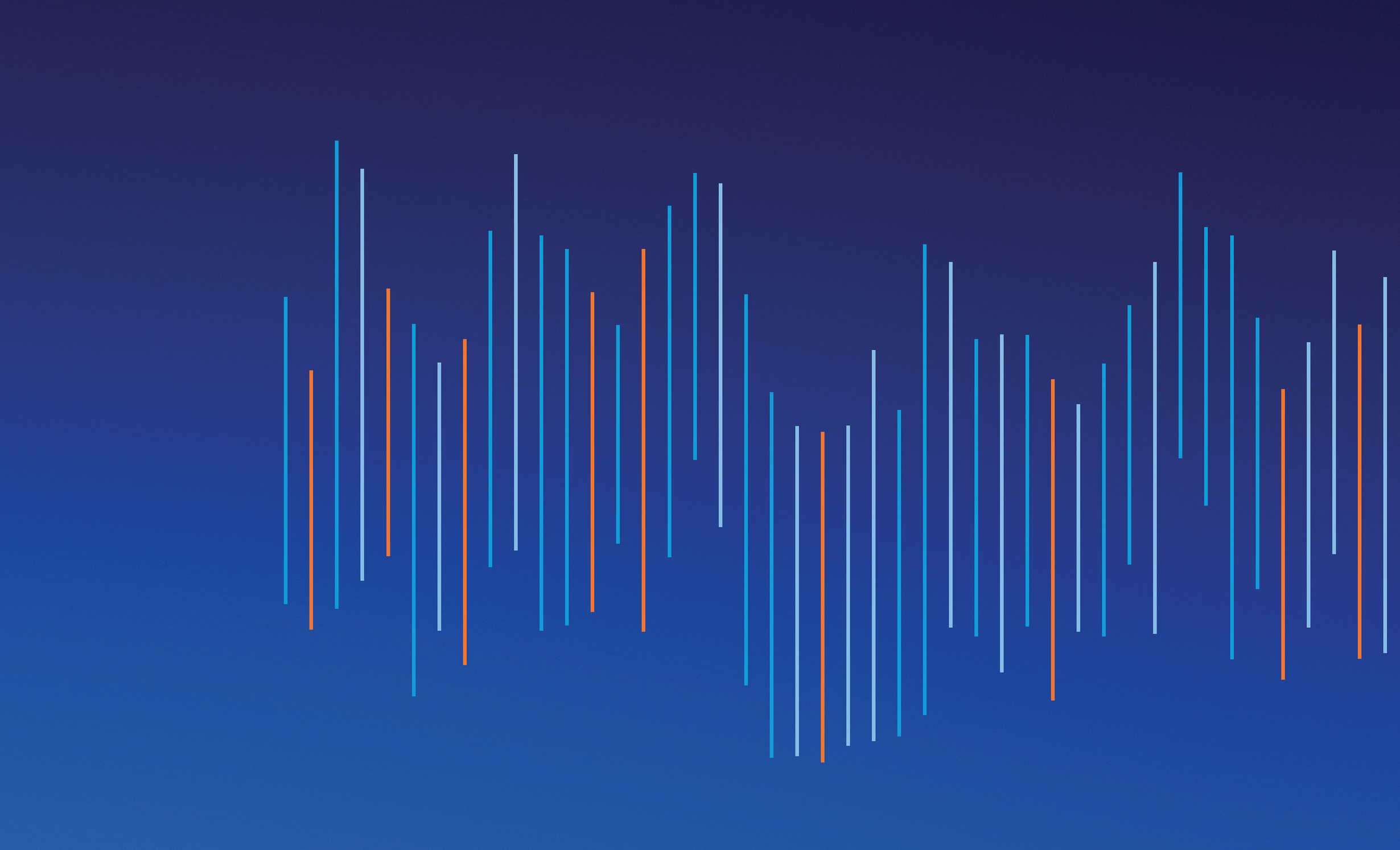
Accident Rates per One Million Departures



Percentage of Fatal Accidents and Onboard Fatalities | 2015-2024

	Taxi, load/ unload, parked, tow	Takeoff	Initial climb	Climb (flaps up)	Cruise	Descent	Initial approach	Final approach	Landing
		0%						50%	
Fatal accidents	0%	0%	0%	0%	50%	0%	0%	0%	50%
Onboard fatalities	0%	0%	0%	0%	0%	0%	0%	0%	0%
		0%						0%	
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.



About This Document

The accident statistics presented in this summary are confined to worldwide commercial jet airplanes that are heavier than 60,000 pounds (27,216 kilograms) 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, that 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 is developed internally from airline operator reports. Flight operations data for non-Boeing airplanes is compiled by Cirium. The source of jet airplane inventory data is Jet Information Services Inc.

Accident data is 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 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.
- 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 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, that data is 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.
- Occurrences classified as missing, unknown or undetermined (CICTT occurrence category UNK) are not included in this publication until otherwise determined by the official ICAO Annex 13 investigation.

Note: The exclusion of the UNK occurrence category is in alignment with industry efforts to identify, prioritize and reduce global high-risk categories of occurrences such as those identified in ICAO's Global Aviation Safety Plan (GASP).

(See the "CAST/ICAO Common Taxonomy Team Aviation Occurrence Categories" section.)

Definitions

Excluded Events (continued)

The following occurrences are **not** considered airplane accidents:

- Those that are the result of experimental flight tests. (However, maintenance flight tests, ferry, positioning, training and demonstration flights are not excluded.)
- Those that are 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 nonfatal injuries from atmospheric turbulence, normal maneuvering, etc.; nonfatal injuries to persons not aboard the airplane; and any events that result from an experimental flight test 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."

Destroyed

The estimated or likely cost of repairs would have exceeded 50% 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.

Definitions

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 5% 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, 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 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 is 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.

State of Operation

Regional data is reported based on the ICAO member state that serves as the headquarters location of the operator involved in the accident.

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

Referenced ICAO and NTSB Definitions

Accident

ICAO defines an “accident” as follows:

Accident. An occurrence associated with the operation of an aircraft that, 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.
- Direct contact with any part of the aircraft, including parts which have become detached from the aircraft.
- 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.
- 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 that 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.

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:

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.

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

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

D. Involves injury to any internal organ.

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

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

NTSB defines "serious injury" as any injury that:

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

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

C. Causes severe hemorrhages, nerve, muscle or tendon damage.

D. Involves any internal organ.

E. Involves second- or third-degree burns, or any burns affecting more than 5% 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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