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A Statistical Analysis of Commercial Aviation Accidents 1958 - 2025

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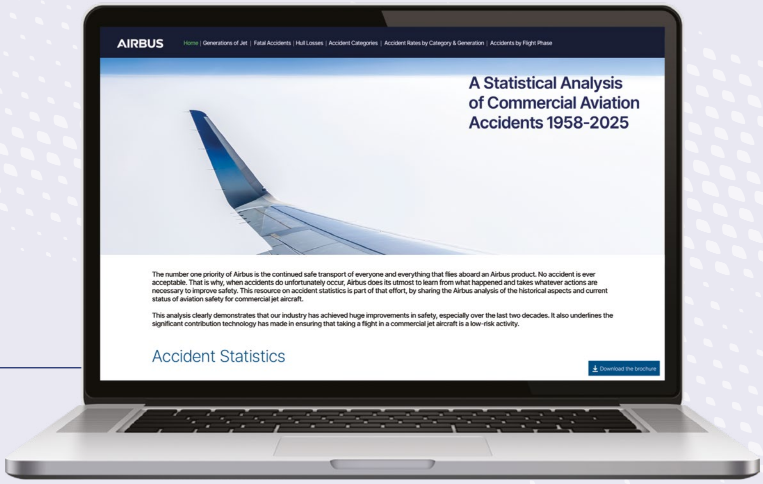

Statistical Analysis of Commercial Aviation Accidents

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Scope & Definitions

This publication provides the Airbus annual analysis of aviation accidents, with commentary on the year 2025, as well as a review of the history of the safety record for commercial aviation.

This analysis clearly demonstrates that the commercial aviation industry has achieved huge improvements in safety over recent decades. It also underlines the significant contribution that technology and positive safety culture have made in ensuring that taking a flight in a commercial jet aircraft is a low-risk activity.

The goal of any review of aviation accidents is to help the industry further enhance the level of safety, therefore, an analysis of forecasted aviation macro trends is also provided. This highlights the key factors influencing the industry's consideration of detailed strategies for the further enhancement of aviation safety across the air transport system.

Scope of the Brochure

- **All Western-built commercial air transport jets that carry over 40 passengers (including cargo aircraft):**
  - Airbus: A220, A300, A300-600, A310, A318/319/320/321, A330, A340, A350, A380
  - Boeing: B707, B717, B720, B727, B737, B747, B757, B767, B777, B787
  - Bombardier CRJ series
  - British Aerospace: Avro RJ series, BAe 146
  - British Aircraft Corporation BAC-111
  - Comac C919
  - Convair 880/990
  - Dassault Mercure 100
  - De Havilland Comet
  - Embraer: E170, E175, E190, E195, ERJ 140, ERJ 145, ERJ 145XR
  - Fokker: F28, F70, F100, VFW 614
  - Hawker Siddeley Trident
  - Lockheed: L-1011
  - McDonnell Douglas: DC-8, DC-9, DC-10, MD-11, MD-80, MD-90
  - Sud-Aviation Caravelle
  - Vickers VC-10
  - Sukhoi Superjet

Note: All other commercial jet aircraft are excluded due to lack of information, and business jets are not considered due to their particular operating environment.

- **Since 1958,** the first year with regularly scheduled transatlantic flights using commercial jet aircraft.
- **Revenue flights**
- **Operational accidents**
- **Hull loss** and **fatal types** of **accidents**

Source of Data

- The accident data was extracted from official accident reports, as well as ICAO, Cirium, and Airbus databases.
- Flight cycle data is revised on an annual basis as further information becomes available from operators.

Definitions

- **Revenue flight:** A flight involving the transport of passengers, cargo or mail. Non revenue flights such as training, ferry, positioning, demonstration, maintenance, acceptance and test flights are excluded.
- **Operational accident:** An accident taking place between the time any person boards the aircraft with the intention of flight until the time all such persons have disembarked, excluding sabotage, military actions, terrorism, suicide and the like. This does not include any accident that is unclassified or unknown until the official investigation determines otherwise.
- **Fatal accident:** An operational accident in which at least one 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.

This excludes the injuries that are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding on the aircraft outside the areas normally accessible by the passengers and crews.

- **Hull loss:** An event in which an aircraft is destroyed or damaged beyond economic repair. The threshold of economic repair decreases with the residual value of the aircraft. Therefore, as an aircraft ages, an event leading to damage that was economically repairable years before may be considered a hull loss.

Definition of Accident Categories

The accident categories described are based on standard ICAO definitions.
The seven categories listed below are the accident types that are the cause of most accidents.

Runway Excursion (RE)
A lateral veer-off or longitudinal overrun off the runway surface, and not primarily due to SCF or ARC.

Loss of Control in-flight (LOC-I)
Loss of aircraft control while in flight, and not primarily due to SCF.

Controlled Flight Into Terrain (CFIT)
In-flight collision with terrain, water, or obstacle without indication of loss of control.

Abnormal Runway Contact (ARC)
Any takeoff or landing involving abnormal runway contact, not primarily due to SCF, leading to an accident. Hard landings and tail strikes are included in this category.

Undershoot/Overshoot (USOS)
Touchdown off the runway surface in close proximity to the runway. It includes offside touchdowns.

System/Component Failure or Malfunction (SCF)
Failure or malfunction of an aircraft system or component, related to its design, the manufacturing process, or a maintenance issue, and which leads to an accident. SCF includes those related to powerplant (SCF-PP) and those which are not powerplant-related (SCF-NP).

FIRE (F-NI and F-POST)
Fire or smoke inside or outside of the aircraft, in flight or on the ground, and regardless of whether the fire results from an impact (F-POST) or not (F-NI).

01. 2025 & Beyond

Traffic and Accidents in 2025

Air traffic increased in 2025, with around 35.2 million flights recorded. This figure represents an increase of approximately 4% compared with 2024.

The industry continued to experience a robust recovery with strong traffic, compared with the previous years.

There were four fatal accidents involving revenue flights, all of which resulted in a hull loss. Additionally, three non-fatal accidents also led to a hull loss.

2025 began with two events in January. A fire broke out on an A321 while it was on the ground. Although the aircraft was destroyed by the flames, all 176 people were safely evacuated. A fatal mid-air collision occurred between a CRJ-700 aircraft and a military helicopter. All 67 people on board both aircraft lost their lives, including the 64 passengers and crew on the aeroplane and three crew on the helicopter.

In February, a CRJ-900 was destroyed following a severe hard landing; all 80 people on board were safely evacuated.

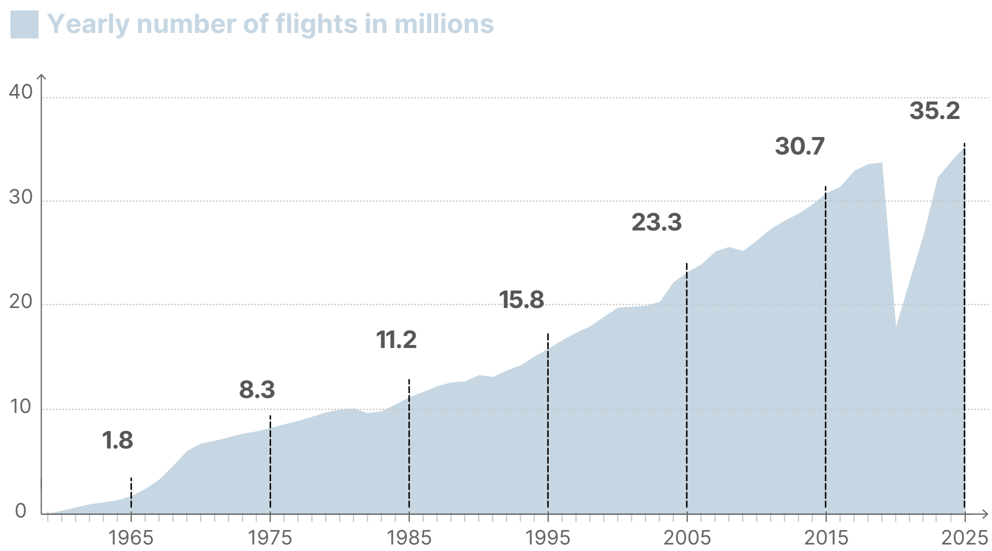
In June, a B787-800 crashed shortly after takeoff due to a loss of engine thrust, resulting in 260 fatalities (241 on board, 19 on the ground). The cause remains under investigation at the time of publishing and is not yet classified. **This event is, therefore, not considered in this statistical analysis.**

In October, a B747-400 cargo was destroyed when it veered off the runway during landing, killing two people in a ground vehicle.

In November, a fatal accident of an MD-11 cargo aircraft occurred during takeoff, resulting in the deaths of all three crew members and eleven people on the ground. In the same month, an Embraer ERJ-145LR suffered a runway excursion at landing. All passengers and crew were safely evacuated, however, the aircraft was declared as a hull loss after being consumed by fire.

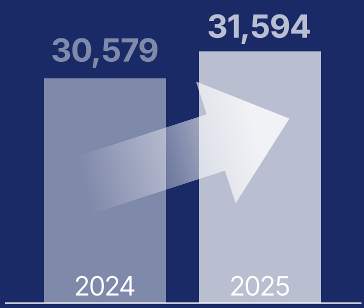
The accidents that occurred throughout 2025 underscore the importance of continuous safety improvements and rigorous investigation protocols. Their outcome must be implemented once turned into existing solutions. Managing safety risks and ensuring organisational resilience requires adhering to the industry's fundamental principles, while collaborating on innovative solutions.

It is noted that safety statistics from a single year may not accurately reflect long-term trends. Therefore, this statistical analysis of commercial aviation accidents uses accident rates based on a 10-year moving average.

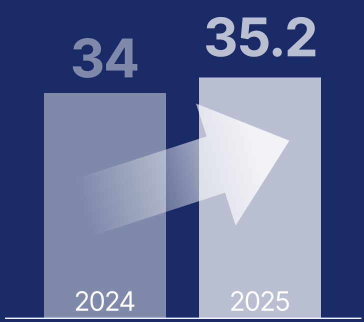


ALL- INDUSTRY COMMERCIAL JETS

Fleet & Traffic Evolution

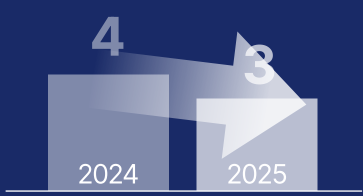


In-Service Fleet Aircraft
(including stored aircraft)

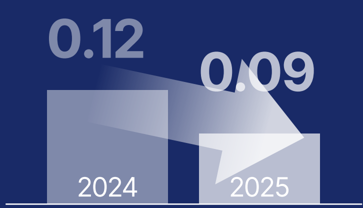


Flight Departures
(in millions)

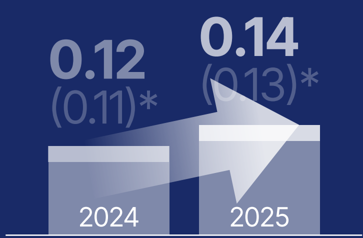
Fatal Accidents



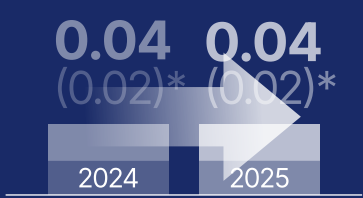
Fatal Accidents



Yearly Fatal Accident Rate
(per million flights)



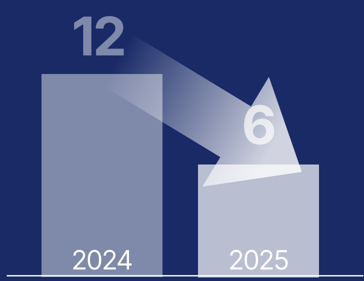
Gen3 Fatal Accident Rate
10yr Moving Average
(per million flights)



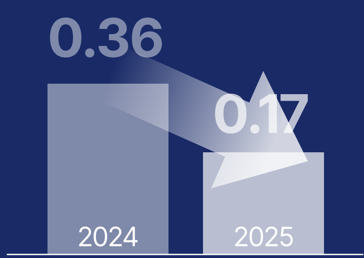
Gen4 Fatal Accident Rate
10yr Moving Average
(per million flights)

*exclude on-ground fatalities only

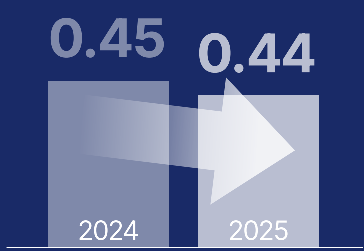
Hull Loss Accidents



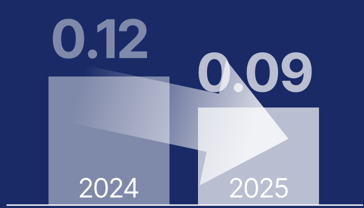
Hull Loss Accidents



Yearly Hull Loss Accident Rate
(per million flights)



Gen3 Hull Loss Accident Rate
10yr Moving Average
(per million flights)



Gen4 Hull Loss Accident Rate
10yr Moving Average
(per million flights)

Outlook for 2026 and Beyond

As the aviation sector continues to manage strong global demand, constant vigilance is required to respond to the safety challenges associated with the expected increase in traffic.

Passenger traffic forecast shows a continuing rebound over the next two to three years, trending towards a long-term growth rate of around 3.6%. Beyond the increased risk exposure due to this expansion, we face an increasingly complex operational environment, driven by the emergence of new operators, types of operations, and evolving threats.

All actors across the industry must work together and share information about how to address the systemic, operational, and emerging threats to ensure that safe aircraft are safely operated, in a safe air transport system.

Fostering a positive safety culture based on open communication across the air transport system is essential for the industry.

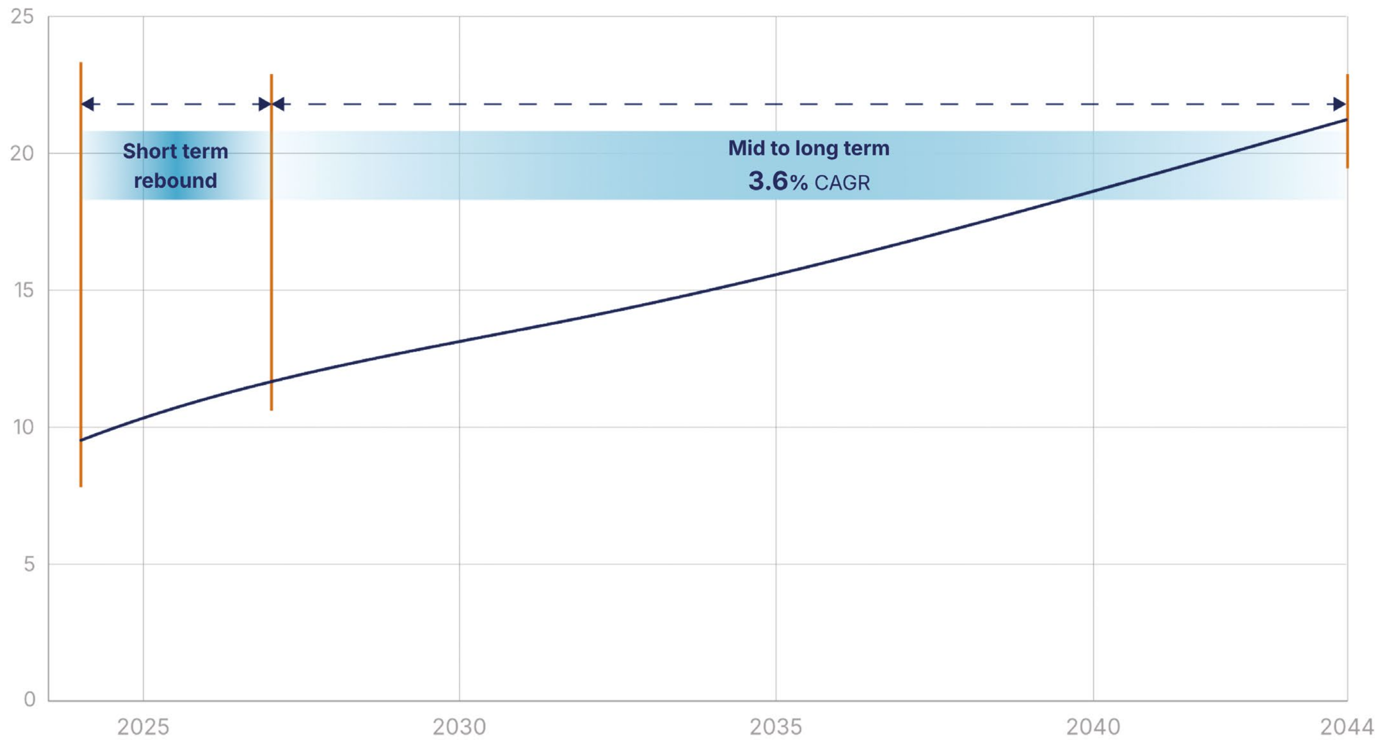
Moving all actors in this same direction requires strong and committed leadership. This involves acting with focus, determination, and ownership, prioritising key decisions to proactively manage safety risks and build organisational resilience.

The basics of aviation safety remain valid: integrating lessons learned from previous accidents, incidents and near-misses, exploring new solutions to prevent events, and guard against complacency.

The women and men working in this industry remain our best asset. This means it is crucial to pass on to younger generations the knowledge, skills, core safety values, and a mindset of going beyond compliance, to achieve our collective goal of zero accidents.

Passenger traffic forecast

Continuing rebound over next 2-3 years trending towards a long-term growth rate of ~3.6% Compound Annual Growth (CAGR).



A call for the industry to intensify efforts in attracting and training new talents to manage the growth and safety challenges.

Over the next two decades, the commercial aviation sector will navigate a complex period of transformation, driven by fleet renewal and surging air traffic demand.

The industry anticipates recruiting 2.35 million skilled professionals to manage this growth. The graph below shows a projection of the global workforce required for the next 20 years with a forecast by region.

This rapid development requires a comprehensive workforce strategy to attract new aviation professionals with suitable competencies. This extends well beyond airlines, as more staff will be needed in ground support, air traffic control, and safety regulation. Workforce expansion in aviation is not merely a matter of increasing numbers of people; its effectiveness depends on the quality and commitment of the new personnel. Furthermore, commercial aviation is also contending with fierce competition from other markets to attract the best individuals.

New professionals need careful training that goes beyond technical skills and builds a strong sense of safety responsibility. This will also depend on the capacity to ensure effective knowledge transfer across generations.

Industry-wide collaboration is key to overcoming this challenge. The aviation sector must find, develop, and retain talented people who are capable of upholding high safety standards. By successfully managing this workforce transition, aviation can continue its global expansion while keeping passengers safe.

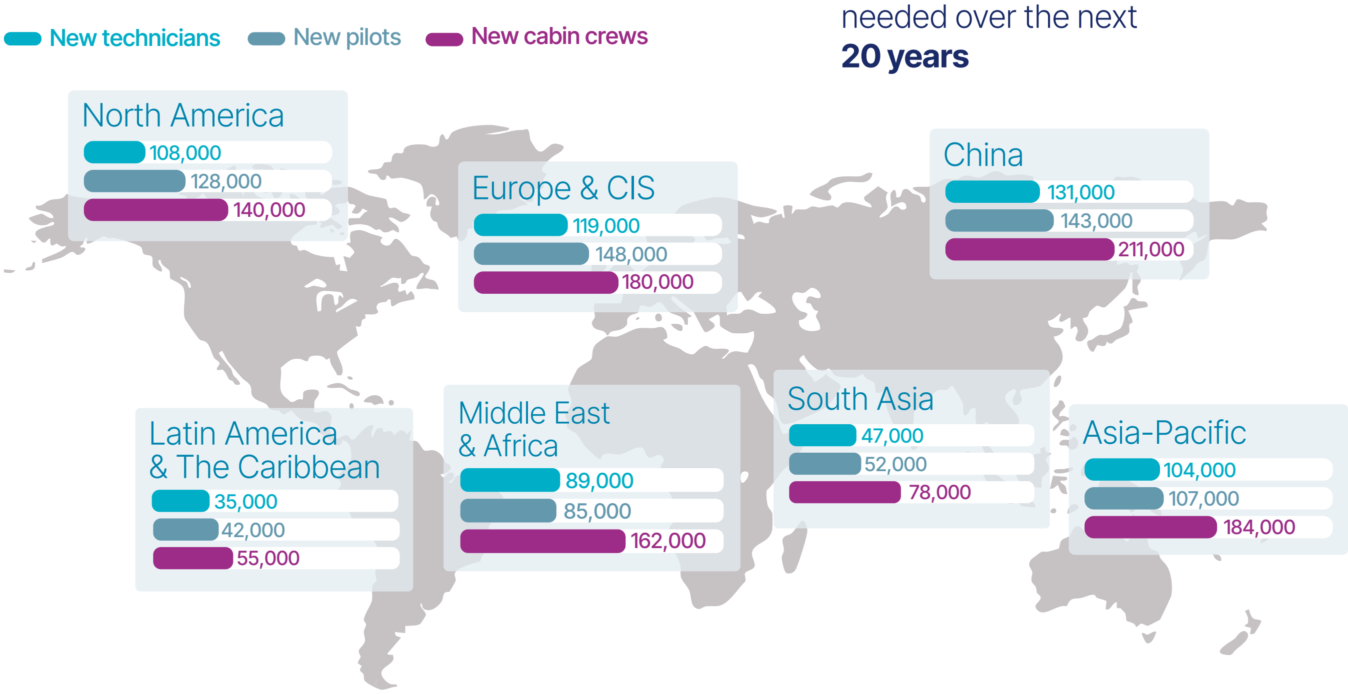
Workforce needed 2025-2044

Technicians needed
705,000

Pilots needed
633,000

Cabin crew needed
1,010,000

2,350,000
cumulative new workforce needed over the next **20 years**

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Focus on Lithium Battery Safety in the Cabin

With more than five billion passengers transported in 2025, the commercial aviation network carried an estimated 20 to 25 billion Portable Electronic Devices (PEDs). The risk of lithium battery fire is a serious safety threat as illustrated by in-service experience including the total loss of aircraft due to fires caused by PED lithium batteries.

The risk of lithium battery fire is heightened by the widespread use of Portable Electronic Devices (PEDs) such as mobile phones, tablets, cameras, powerbanks, and e-cigarettes. Recent studies indicate that e-cigarettes and powerbanks account for approximately 60% of lithium battery fires.

Addressing this systemic risk effectively requires a proactive safety culture across the entire air transport system. Aviation safety relies on collaboration and the transparent sharing of safety initiatives and lessons learned among airlines, regulators, airport authorities, ground service providers, and passengers.

A significant part of this collaborative safety culture must extend to the travelling public. The need for enhanced passenger awareness has become a critical focus for ensuring flight safety. To that end, EASA published a **Safety Information Bulletin in May 2025**, and the FAA website has a **Lithium Battery Resources** website page. Both highlight the need to inform and educate passengers about the risks and limitations associated with the transport and use of lithium battery-powered devices on board aircraft.

It remains essential to consistently review and adhere to the latest procedures. Global organisations such as ICAO and IATA, along with regulators like the FAA and EASA, frequently update their guidance to support all stakeholders. These resources are essential for staying informed about the evolving challenges related to the air transport of lithium batteries.

While industry measures, such as crew training for battery fires, are essential, a collective commitment from passengers is equally important. The entire industry must work together to anticipate and mitigate these risks, ensuring every passenger understands their role in keeping everyone safe.

The QR codes below provide access to further information about lithium batteries.

For more information, please scan the QR codes below.

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EASA-SIB 2025-03

FAA AC 120-80B

EASA Dangerous Goods

IATA Lithium Battery Risk Assessment Guidance for Operators

02. Commercial Aviation Accidents 1958-2025

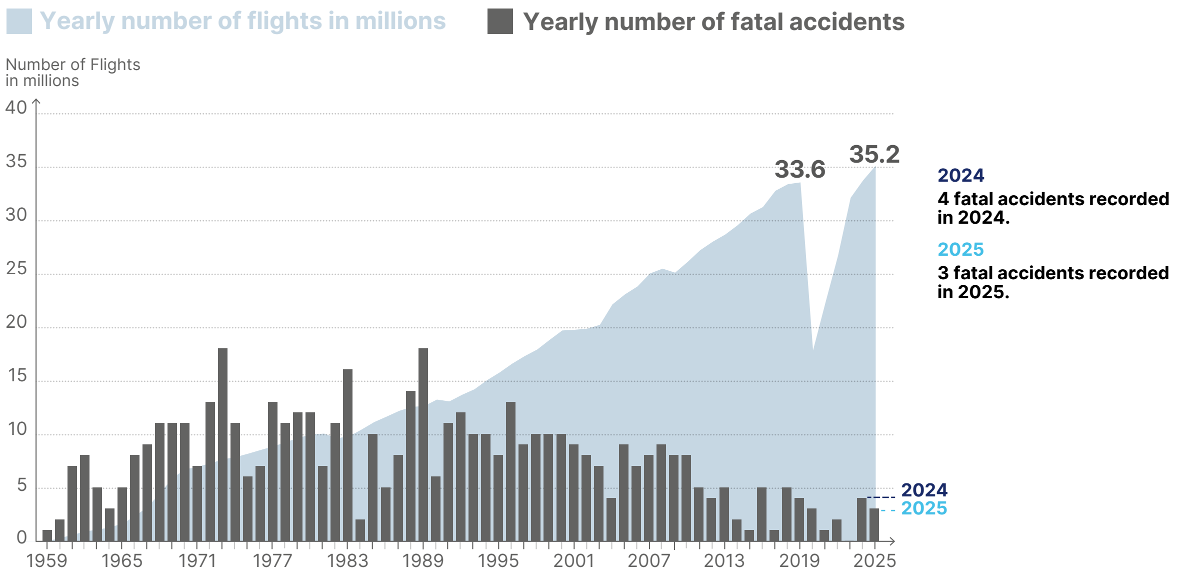
Evolution of the Number of Flights and Accidents

The number of accidents in 2025 decreased compared with 2024.

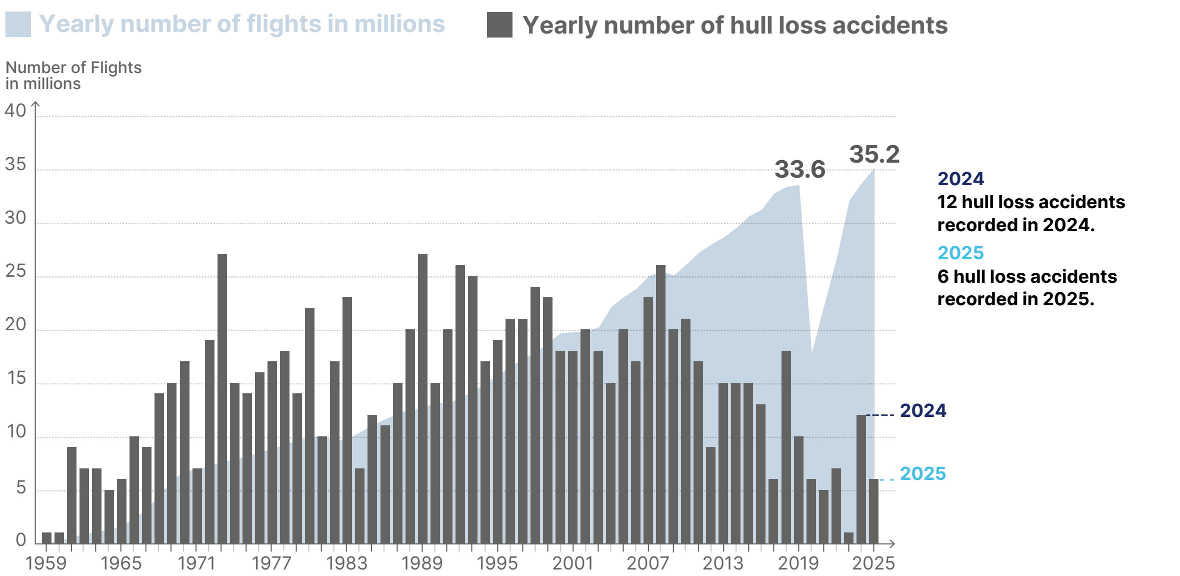
In contrast to 2024, which saw four fatal accidents and twelve hull losses, 2025 recorded three fatal accidents, all of which resulted in hull losses, alongside a further three hull losses without fatalities. The long-term trend remains: the total number of accidents continues to decrease each decade.

As the number of accidents and flights will vary each year, accident rates are more relevant than reviewing the number of accidents per year when analysing trends.

Fatal



Hull loss

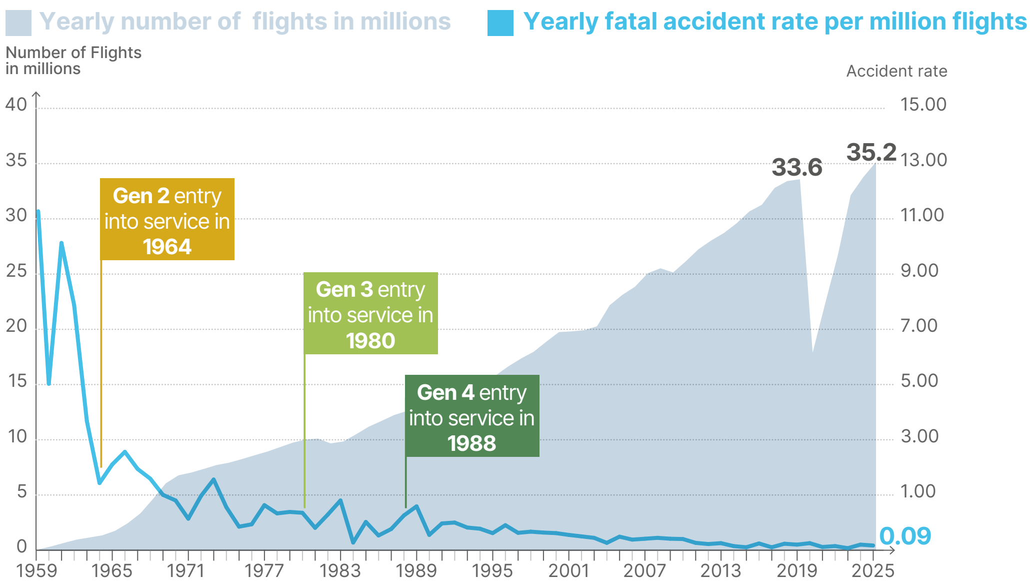


Evolution of the Yearly Accident Rate and Air Traffic

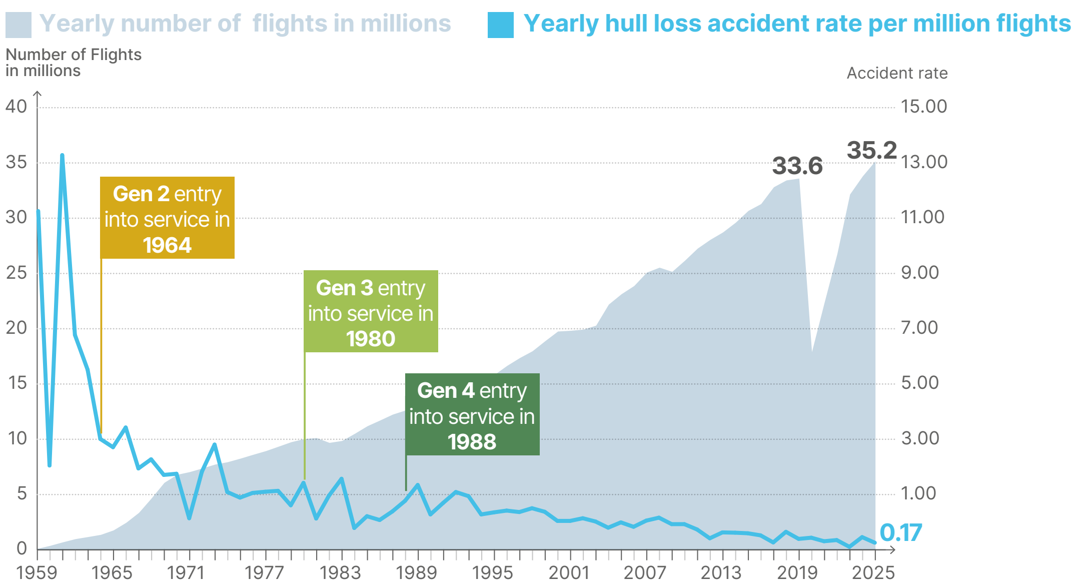
The rate of fatal accidents and hull losses is steadily decreasing over time. However, the growth in air traffic is increasing. As a result, the industry must remain vigilant, avoiding the trap of complacency.

There were far fewer flights in the 1960s, but a peak in the accident rates is shown due to the lower number of flights and the higher number of accidents recorded during this period. However, the volume of flights over recent decades clearly demonstrates that the accident rate is continually decreasing, driven by the introduction of new technologies with each generation of aircraft and the evolution of a positive safety culture. More detailed information and analysis of the impact of these technologies and safety culture is provided in this chapter and in Chapter 3.

Fatal



Hull loss



Four Generations of Jet

Early Commercial Jets

Generation 1

From 1952
Dials and gauges in cockpit, Early auto-flight systems.
Comet, Caravelle, BAC-111, Trident, VC-10, B707, B720, DC-8, Convair 880/990

Glass Cockpit & FMS

Generation 3

From 1980
Electronic cockpit displays, improved navigation performance and Terrain Avoidance Systems, to reduce CFIT accidents.
A300-600, A310, Avro RJ, F70, F100, B717, B737 Classic & NG/MAX, B757, B767, B747-400/-8, Bombardier CRJ, Embraer ERJ, MD-11, MD-80, MD-90

More Integrated Auto-Flight

Generation 2

From 1964

More elaborate auto-pilot and auto-throttle systems.

Concorde, A300, Mercure, F28, BAe146, VFW 614, B727, B737-100/-200, B747-100/-200/-300/SP, L-1011, DC-9, DC-10

Fly-By-Wire

Generation 4

From 1988

Fly-By-Wire technology enabled flight envelope protection to reduce LOC-I accidents.

A220, A318/A319/A320/A321, A330, A340, A350, A380, B777, B787, C919, Embraer E-Jets, Sukhoi Superjet

Evolution of Commercial Jet Aircraft

Airbus aircraft flew 79% of the flights made by generation 4 commercial jet aircraft in 2025.

There were more than 35 million flights in 2025. Around 21 million flights were made by generation 4 commercial jets, more than 16 million of which were Airbus aircraft.

The largest percentage of flights in recent years were made using the latest generation 4 commercial jets, which have the lowest accident rate. As the percentage increases over the next decade, this should help further reduce the overall accident rate for commercial air transport.

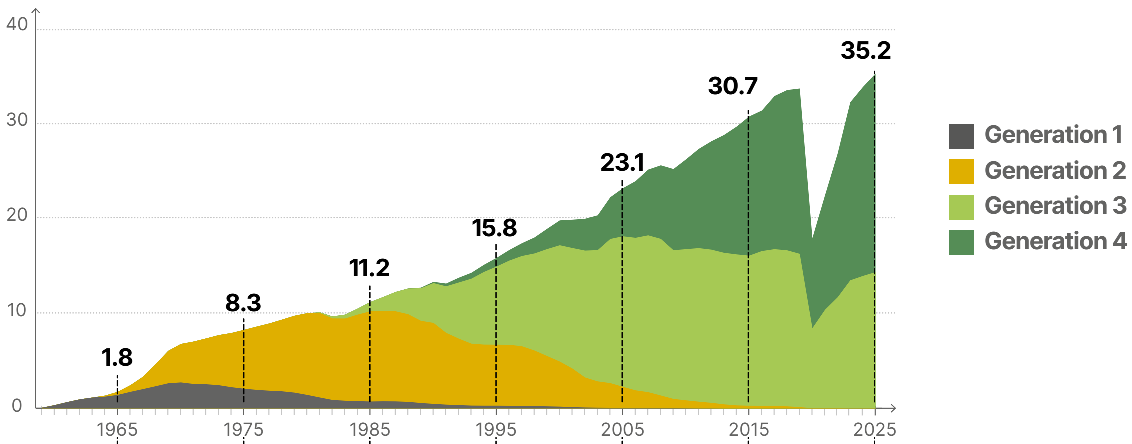
The continual reduction in accident rates shown on the previous pages has been achieved by an ongoing commitment of the commercial aviation industry to enable a safe aircraft to be safely operated in a safe air transport system.

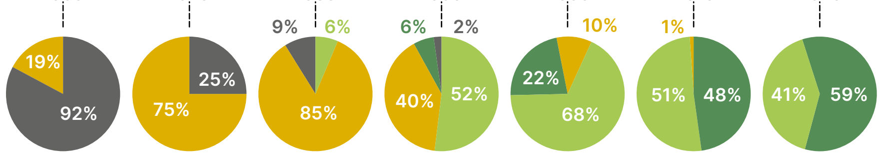
A notable part of this success is due to effective regulation, a strong safety culture, and improvements in training. Technological advances are also a crucial enabler for enhancing the level of safety. In particular, technologies introduced in aircraft systems intentionally evolved with improving safety as their aim.

The first generation of commercial jet aircraft were designed in the 1950s and 1960s with system technologies, which were limited in their capabilities by the analogue electronics of that era. A second generation of aircraft quickly appeared with improved autoflight systems.The third generation of aircraft was introduced in the early 1980s. This generation took advantage of digital technologies to introduce glass cockpits with flight management systems and navigation displays, which significantly improved navigation capabilities and position awareness. Combined with the Terrain Awareness and Warning System (TAWS), these evolutions were key to reducing Controlled Flight Into Terrain (CFIT) accidents.

The fourth and latest generation of commercial jet aircraft first entered into service in 1988 with the Airbus A320. Generation 4 aircraft use fly-by-wire technology with flight envelope protection functions. These functions protect against Loss Of Control In-flight (LOC-I) accidents. Fly-by-wire technology is now the industry standard and it is used on every currently produced Airbus model, Boeing B777 and B787, Comac C919, Embraer E-Jets, and the Sukhoi Superjet.

Yearly number of flights per aircraft generation (in millions)





Percentage of flights by Aircraft Generation Over the Years

Evolution of Accident Rates

The continual reduction of accident rates over the years has been achieved by constant commitment of the commercial aviation industry to enable a safe aircraft to be safely operated in a safe air transport system.

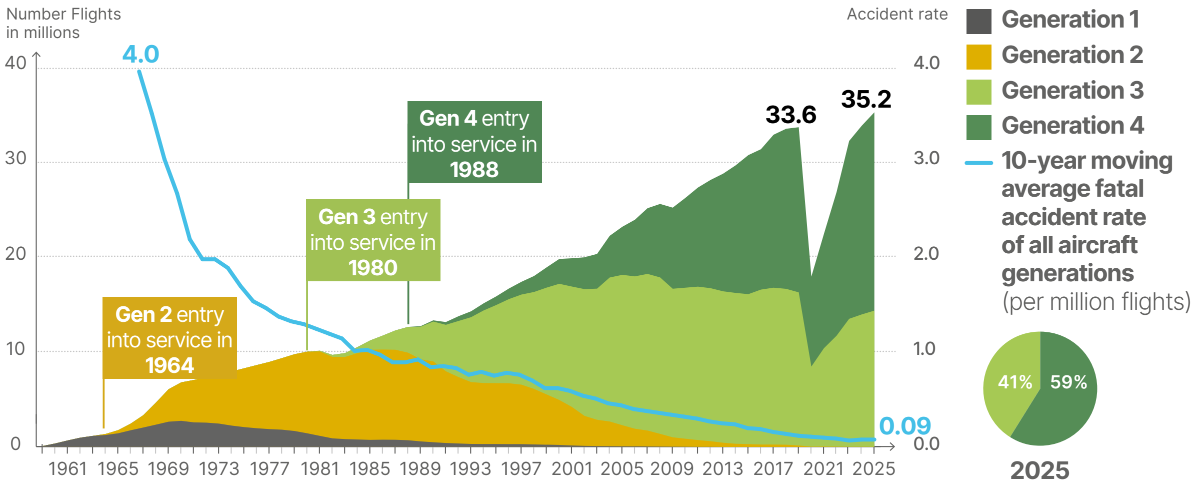
With the increase in air traffic comes increasing risk exposure. It is, therefore, fundamental for the industry to continually reinforce its focus on safety. This will require adapting to emerging challenges.

The 10-year moving average accident rate provides a clearer picture of an overall trend. A notable part of this success is due to effective regulation, a strong safety culture, and improvements in training. Technological advances are also a crucial enabler for enhancing the level of safety. In particular, technologies introduced in aircraft systems intentionally evolved with improving safety as their aim.

The graphs below show the 10-year moving average fatal accident and hull loss accident rates of all aircraft generations (per million flights) and the evolution of the air traffic for each aircraft generation over the year.

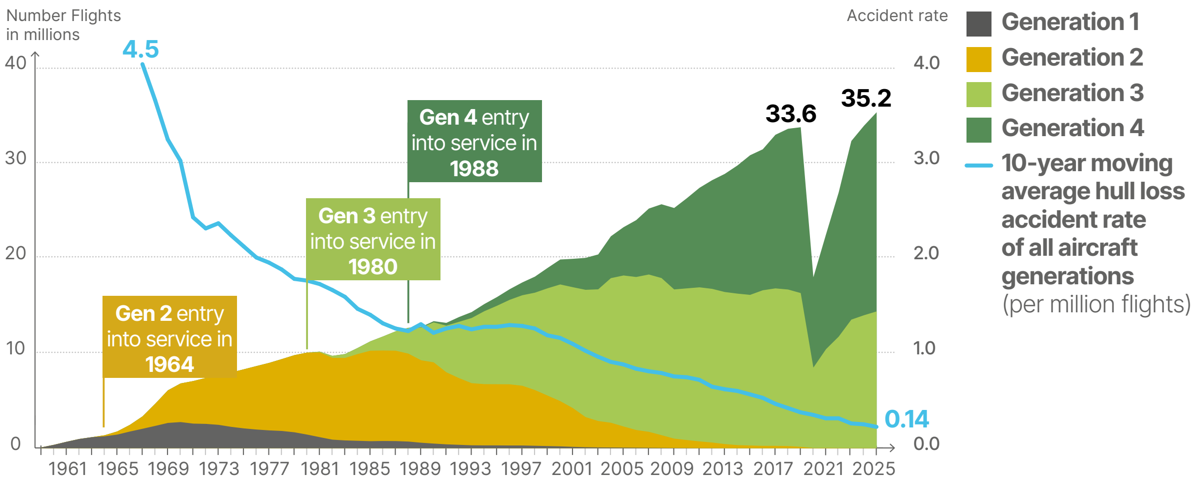
Fatal

10-year moving average fatal accident rate of all aircraft generations (per million flights) **and yearly number of flights per aircraft generation** (in millions)



Hull loss

10-year moving average hull loss accident rate of all aircraft generations (per million flights) **and yearly number of flights per aircraft generation** (in millions)



How Technology Helped Reduce Accidents

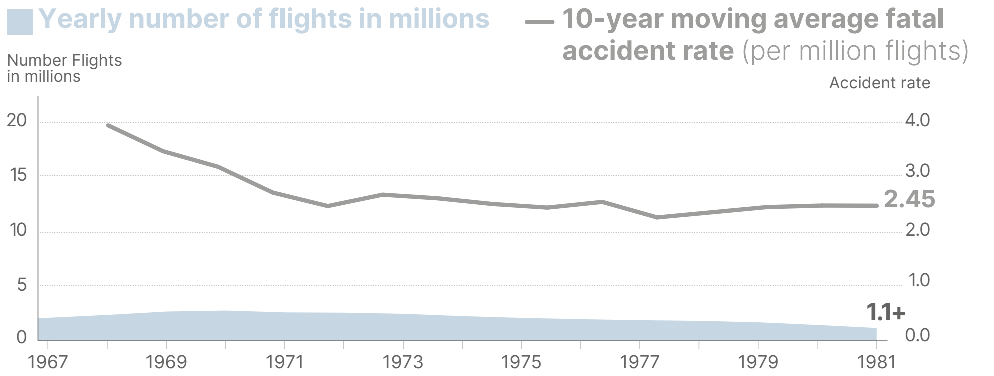
Generation 1

Early Commercial Jets

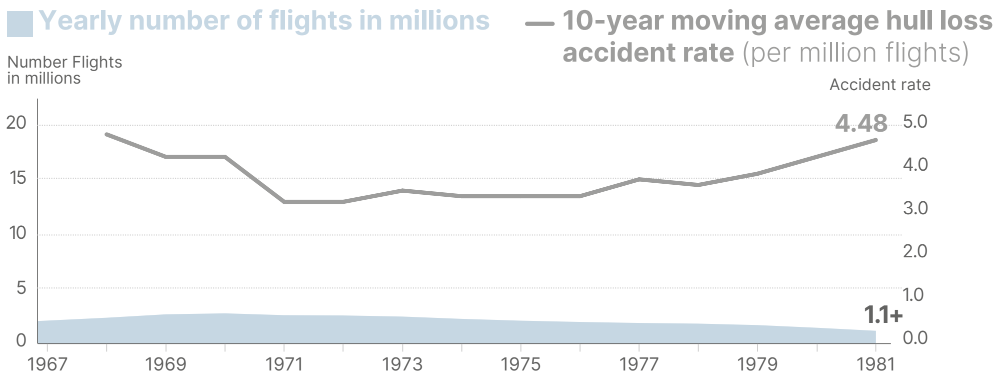
From 1952

Dials and gauges in cockpit, Early auto-flight systems
Comet, Caravelle, BAC-111, Trident, VC-10, B707, B720, DC-8, Convair 880/990

Fatal



Hull loss



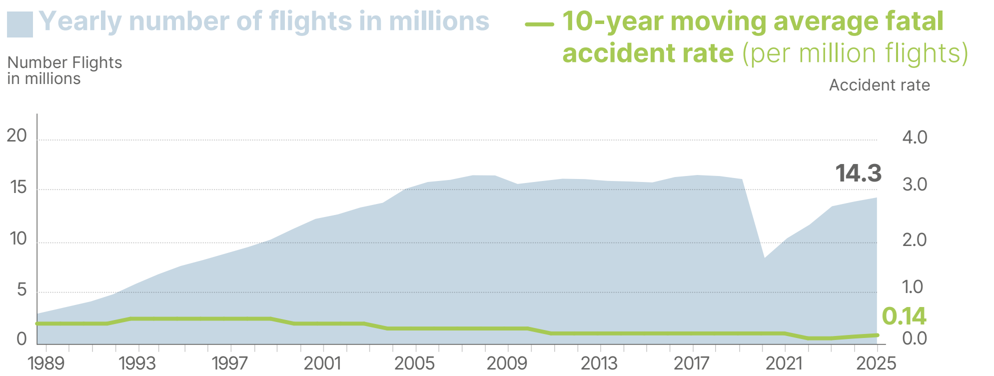
Generation 3

Glass Cockpit & FMS

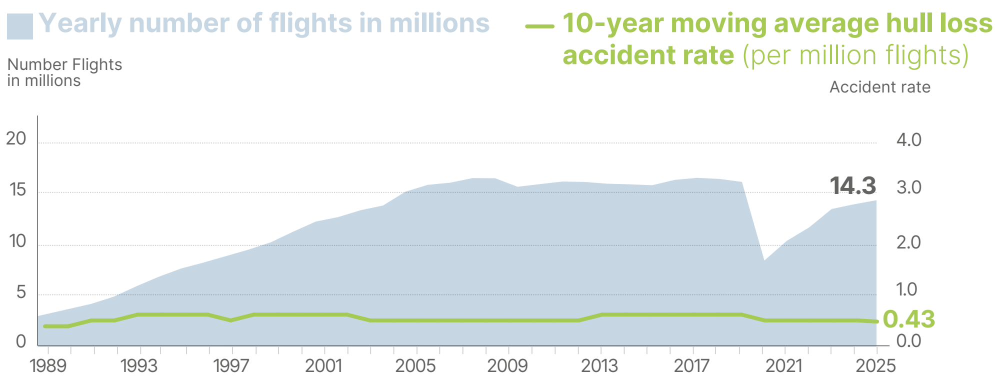
From 1980

Electronic cockpit displays, improved navigation performance and Terrain Avoidance Systems, to reduce CFIT accidents
A300-600, A310, Avro RJ, F70, F100, B717, B737 Classic & NG/MAX, B757, B767, B747-400/-8, Bombardier CRJ, Embraer ERJ, MD-11, MD-80, MD-90

Fatal



Hull loss



Statistics over the life of each aircraft generation show a significant improvement in the level of safety, notably since the introduction of generation 3 aircraft, further enhanced by the latest generation 4 aircraft.

A comparison of the 10-year moving accident rates by generation of aircraft clearly illustrates the value of commercial aviation industry investments in technology to improve safety.
The graphs below show the evolution of air traffic on each generation of jet aircraft. The 10-year moving average (per million flights) accident rate per aircraft generation has been notably reduced since the introduction of generation 3 and safety has been further enhanced with generation 4 jets.

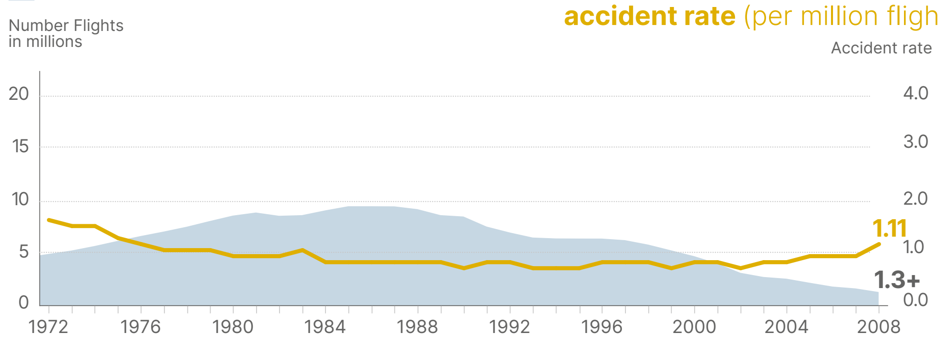
Generation 2

More Integrated Auto-Flight

From 1964
More elaborate auto-pilot and auto-throttle systems Concorde, A300, Mercure, F28, BAe146, VFW 614, B727, B737-100/-200, B747-100/-200/-300/SP, L-1011, DC-9, DC-10

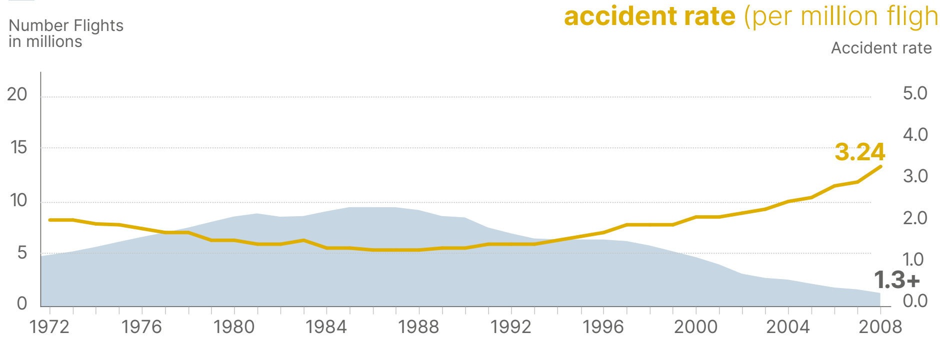
Fatal

Yearly number of flights in millions — **10-year moving average fatal accident rate** (per million flights)



Hull loss

Yearly number of flights in millions — **10-year moving average hull loss accident rate** (per million flights)



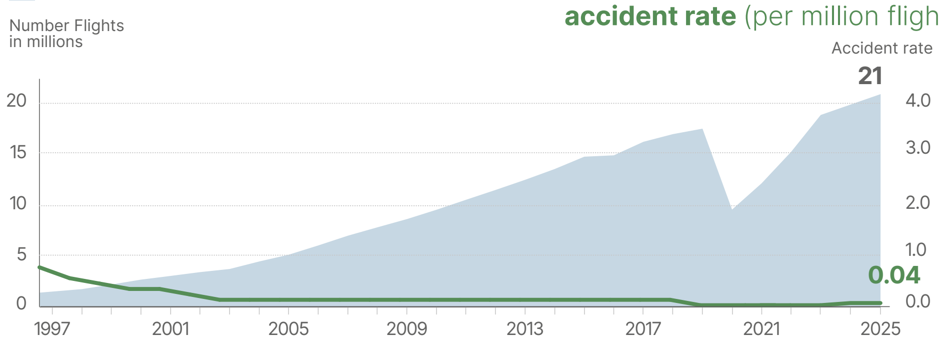
Generation 4

Fly-By-Wire

From 1988
Fly-By-Wire technology enabled flight envelope protection to reduce LOC-I accidents A220, A318/A319/A320/A321, A330, A340, A350, A380, B777, B787, C919, Embraer E-Jets, Sukhoi Superjet

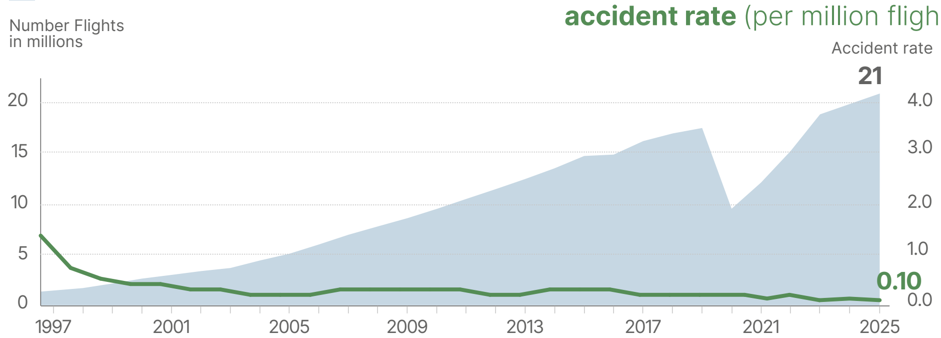
Fatal

Yearly number of flights in millions — **10-year moving average fatal accident rate** (per million flights)



Hull loss

Yearly number of flights in millions — **10-year moving average hull loss accident rate** (per million flights)



Evolution of Accident Rates by Aircraft Generation

Advances in technology have helped to reduce accident rates for each generation.

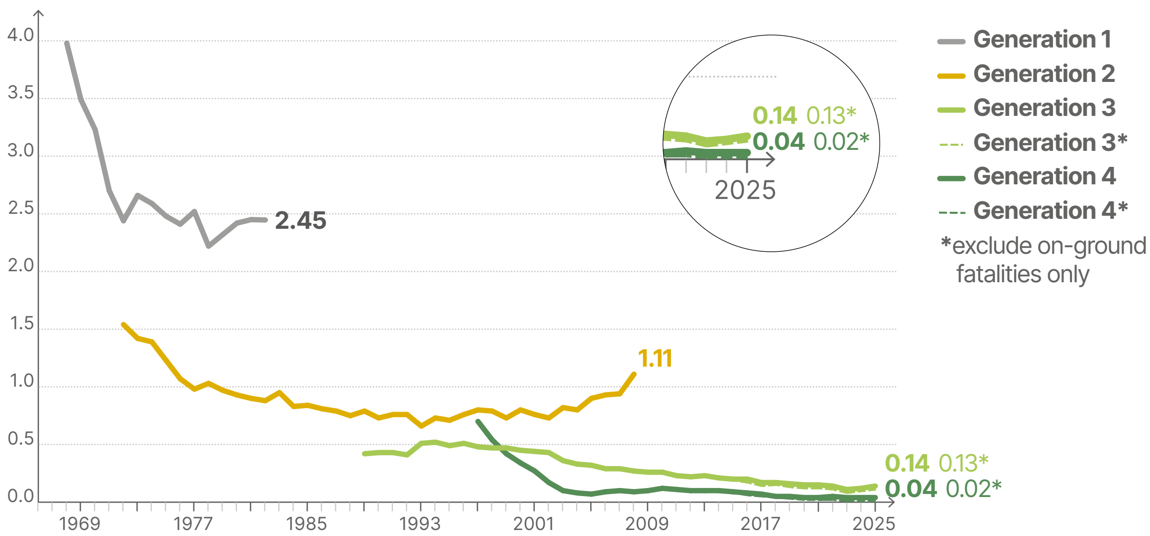
Calculating the 10-year moving average accident rate provides a clearer picture of an overall trend. The data shows when an aircraft generation has recorded more than 1 million flights in a year and begins from the tenth year after the entry into service of each generation.

For example, the 10-year moving average accident rates for generation 4 commercial jet aircraft are shown from 1997, which was the tenth year in service for the A320 aircraft.

The 10-year moving average accident rates for today's generation 4 aircraft are around three times lower than the rates recorded for generation 3 aircraft.

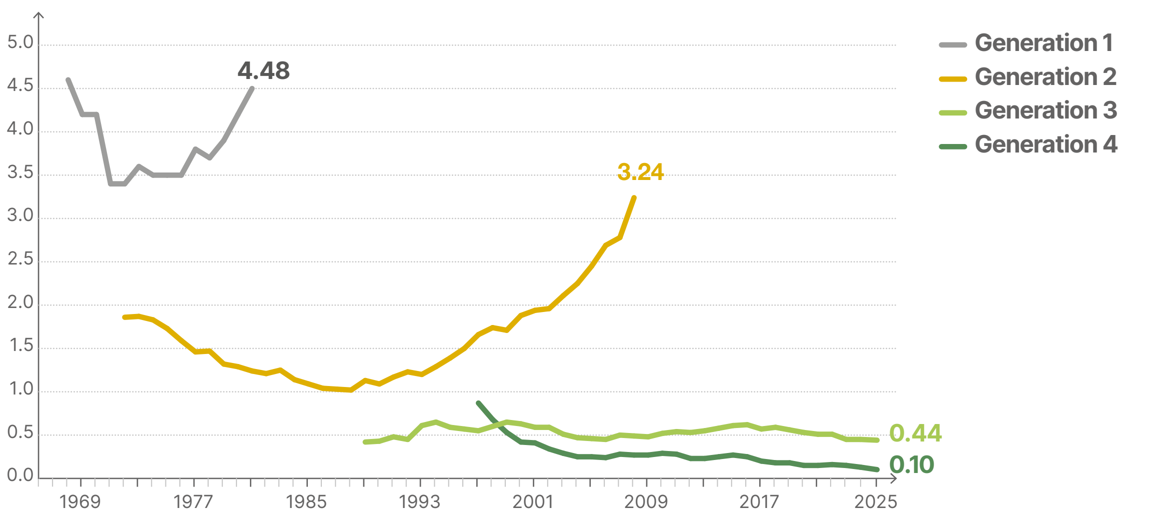
Fatal

10-year moving average fatal accident rate (per million flights) per aircraft generation



Hull loss

10-year moving average hull loss accident rate (per million flights) per aircraft generation



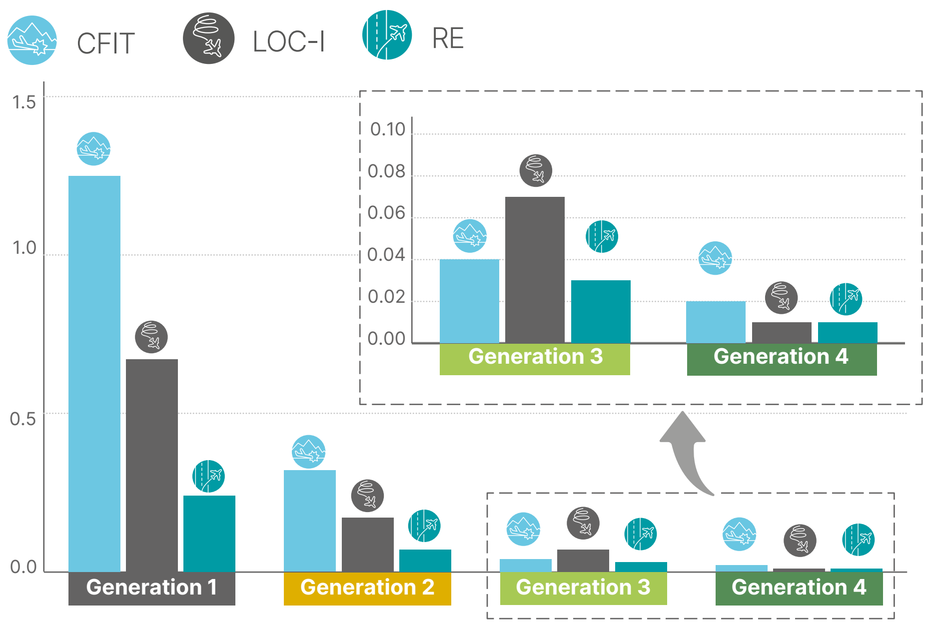
How Technology Addressed the Major Causes of Accidents

Accident rates were further reduced with the introduction of new technologies on each generation of aircraft.

The introduction of the glass cockpits, with flight management systems and navigation displays as well as the Terrain Awareness and Warning System (TAWS) on generation 3 aircraft significantly reduced the number of CFIT fatal accidents when compared to the previous generation 1 and generation 2 aircraft.

The benefits of fly-by-wire technologies and energy management systems, which were first introduced on generation 4 aircraft, show a lower rate of LOC-I and RE accidents when compared with the previous generation 3 aircraft. A more detailed analysis of how these technologies influence the reduction of accident rates is presented in Chapter 3.

Average fatal accident rate (per million flights) per accident category 1958-2025



-87%

CFIT accident rate
from generation 2
to generation 3

-91%

LOC-I accident rate
from generation 3
to generation 4

-60%

RE accident rate
from generation 3
to generation 4

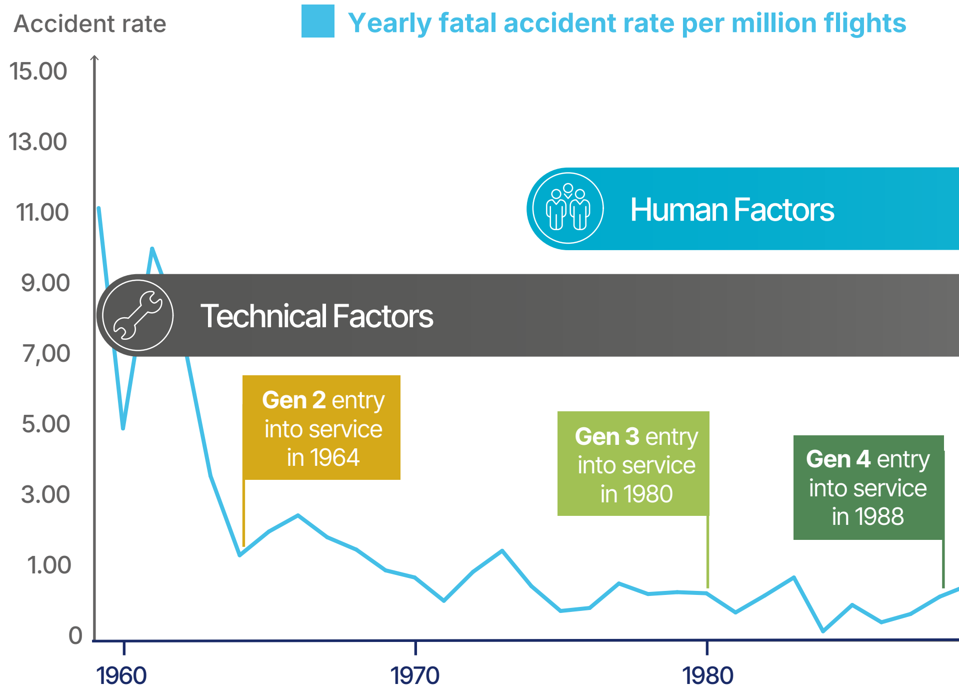
Evolution of a Positive Safety Culture

A positive safety culture is a journey of continuous improvement. While technology contributes to preventing accidents, the industry has acknowledged the need to expand its focus to human and organisational factors.

In the early days, commercial aviation established a strong legacy of technological progress by improving aircraft design (e.g., autopilot, auto-throttle systems, electronic displays, flight management systems, flight envelope protection, etc.).

By the 1970s, the industry recognised Human Factors as a critical element in accident prevention. This led to the introduction of Crew Resource Management (CRM), which became a standard practice in the 1980s.

In the 1990s, the scope of safety expanded to include organisational factors in the industry. This marked the start of the era, which views safety as a shared responsibility, not just an individual one. This philosophy was formalised through the Safety Management System (SMS), which proactively manages safety risks to build organisational resilience, allowing the system to recover, adapt, mitigate, and anticipate safety risks.



Safety Culture Examples

Technical factors
Technical improvements focused on aircraft reliability, establishing the basis for modern technology.

Human Factors
In the 1970s, the industry also began to focus on Crew Resource Management (CRM) and standard phraseology, which rapidly expanded to include the human-machine interface.

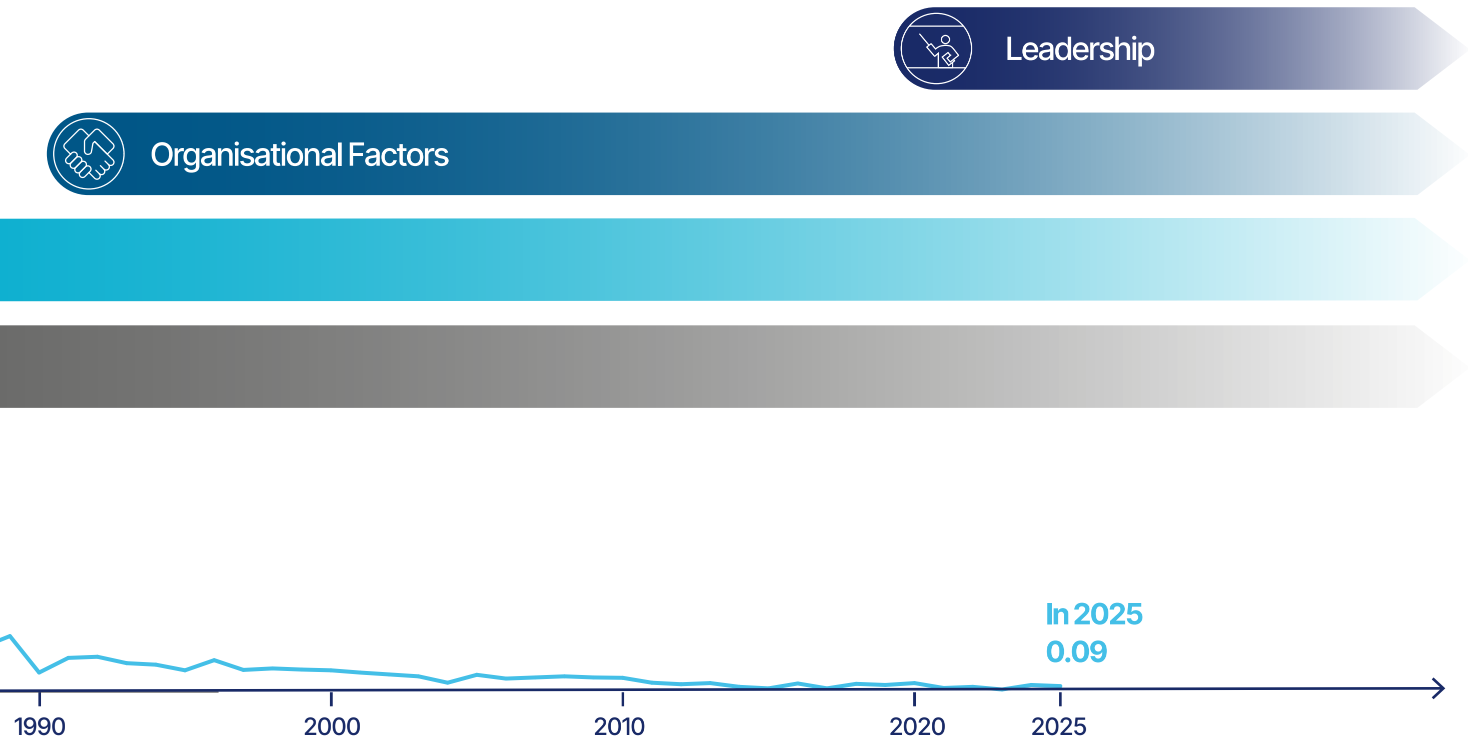
This establishes safety as a core value, not just a set of rules, driving continuous improvement throughout the organisation.

The SMS relies on the organisation's safety culture. Therefore, enhancing the safety culture is essential journey for addressing future challenges and strengthening safety at all levels of the air transport system.

Safety culture requires more than just looking ahead; it relies on a strong focus on the present. The industry must prioritise the deployment of proven solutions while strictly adhering to core fundamentals.

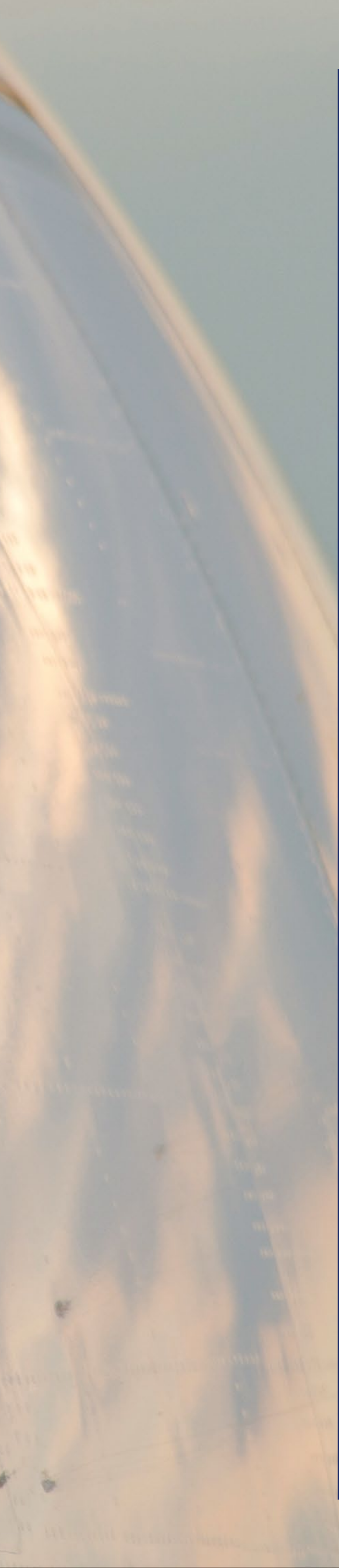
As illustrated in the infographic below, the aviation accident rate has continuously decreased. This is driven by technological advances of each aircraft generation and a positive safety culture which encompasses technical, human factors, and organisational factors.

Moving all actors towards a safer aviation industry requires strong and committed leadership. This involves acting with focus, determination, and ownership, prioritising key decisions to proactively manage safety risks and build organisational resilience.



Proactive Organisational Approach
ICAO introduced the foundation of the Safety Management System (SMS) for industry stakeholders, and the Regional Aviation Safety Groups (RASGs).

Safety Leadership
Moving all actors towards a safer aviation industry requires strong and committed leadership. This involves acting with focus, determination, and ownership, prioritising key decisions to proactively manage safety risks and build organisational resilience.



03. Commercial Aviation Accidents Over the Last 20 Years

Evolution of the Yearly Accident Rate

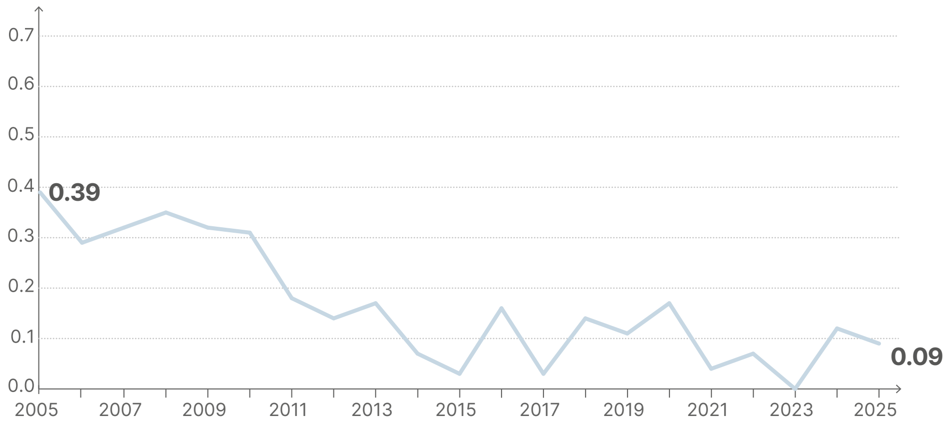
A significant reduction in fatal and hull loss accidents was achieved across the commercial aviation industry in the last 20 years.

In 2025, there was a decrease in the accident rate with three fatal accidents, three of which were hull losses and three additional hull losses without fatalities.

Despite the reduction of the yearly accident rate in the last 20 years, rates recorded for the years affected by the pandemic show a varying range. This may be partially attributed to the variability of the number of flights recorded in each year. This also shows that the accident rate for a single year is not indicative of an overall safety trend.

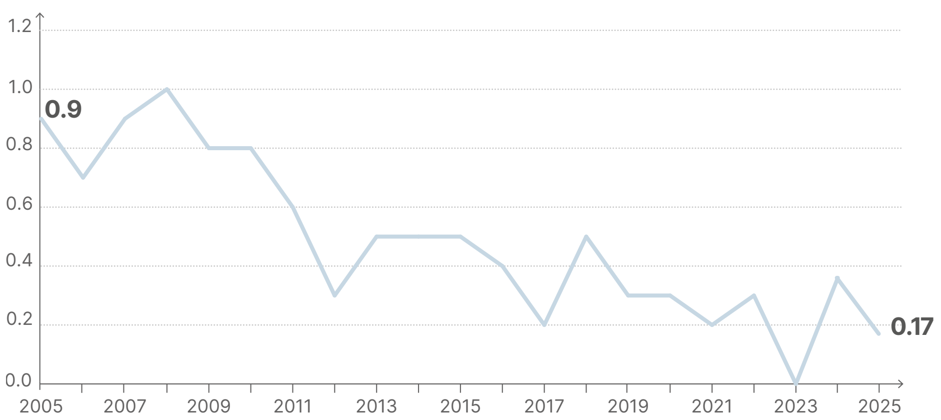
Fatal

Yearly fatal accident rate per million flights



Hull loss

Yearly hull loss accident rate per million flights



Evolution of Accident Rates by Aircraft Generation

Generation 4 aircraft accident rates are 3 times lower than generation 3 aircraft accident rates.

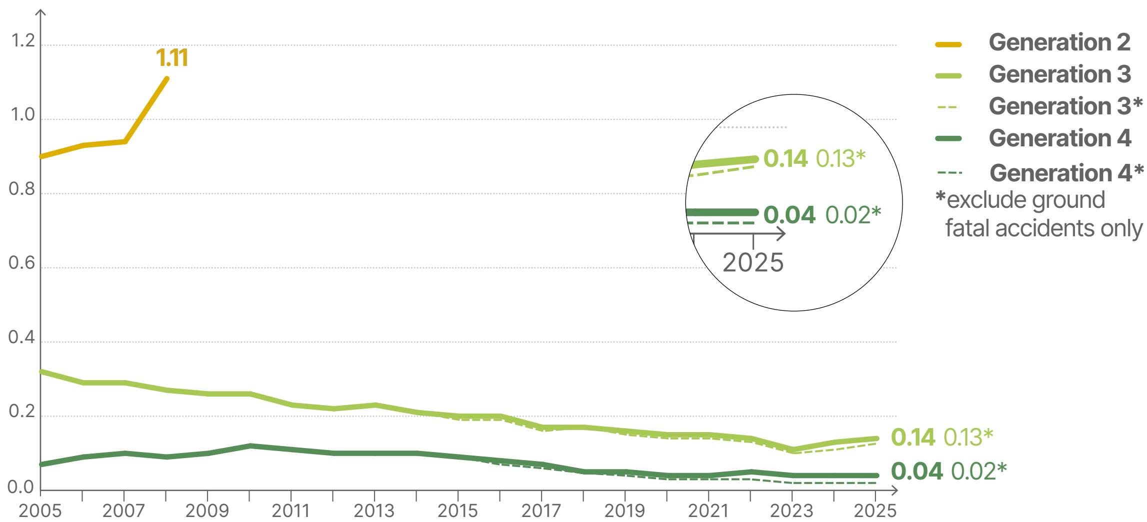
Generation 3 aircraft technology helped to reduce accident rates by introducing glass cockpits with navigation displays and flight management systems. Generation 4 aircraft technology helped to further reduce accident rates by introducing fly-by-wire technology, which made flight envelope protection possible.

The accident rate for both generation 3 and 4 aircraft remained low in 2025. Generation 4 commercial jet aircraft flew 59% of the flights in 2025 and this figure will continue to increase over the coming decades.

The overall accident rate for commercial air transport should continue to decrease due to the noticeably lower rate of generation 4 aircraft.

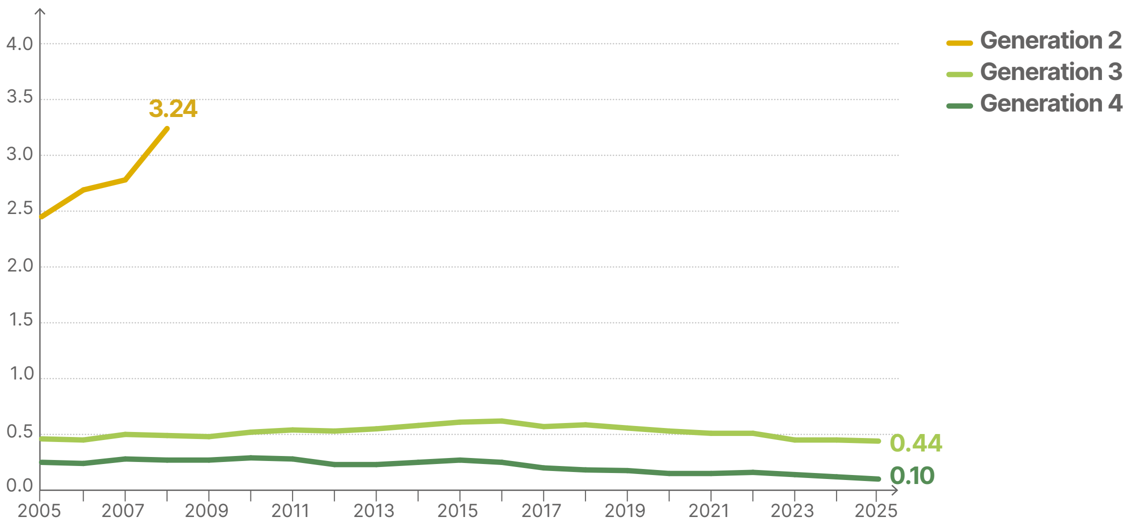
Fatal

10-year moving average fatal accident rate (per million flights) per aircraft generation



Hull loss

10-year moving average hull loss accident rate (per million flights) per aircraft generation



Accidents by Flight Phase

Definitions of Flight Phases

The flight phases described below are based on standard ICAO definitions:

- **Standing:** The phase of flight prior to pushback or taxi, or after arrival, at the gate, ramp, or parking area, while the aircraft is stationary.
- **Taxi:** The aircraft is moving under its own power prior to takeoff or after landing. This phase includes the taxi to runway, the taxi to takeoff position and the taxi from runway until the aircraft stops moving under its own power.
- **Takeoff:** From the application of takeoff power, through rotation and to an altitude of 35 feet above runway elevation or until gear-up selection, whichever comes first. This phase includes rejected takeoff.
- **Initial climb:** From the end of the takeoff phase to the first prescribed power reduction, or until reaching 1000 feet above runway elevation, whichever comes first.
- **Enroute:** From completion of initial climb through cruise altitude and completion of controlled descent to the Initial Approach Fix (IAF).
- **Approach:** From the IAF to the point of transition from nose-low to nose-high attitude immediately prior to the flare above the runway.
- **Landing:** The phase of flight from the point of transition from nose-low to nose-up attitude, immediately before landing (flare), through touchdown and until the aircraft exits the landing runway or when power is applied for takeoff in the case of a touch-and-go landing, whichever occurs first.

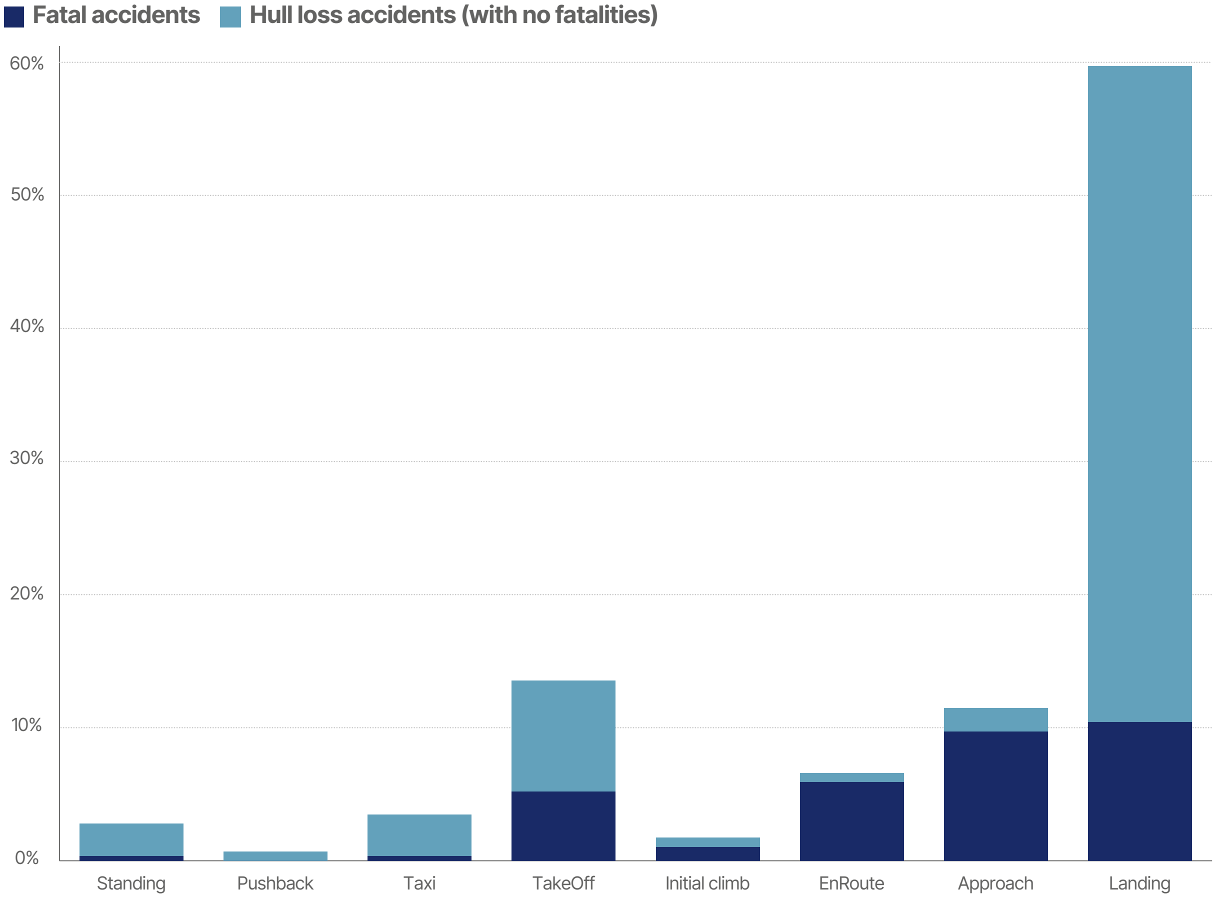
Most of the accidents over the last 20 years occurred during approach and landing phases.

Of the three hull loss accidents without fatalities recorded in 2025, two occurred during landing. A significant proportion of accidents recorded over the last two decades occurred during takeoff, approach, and landing phases.

Approach and landing are highly complex flight phases, which place significant demands on the crew in terms of navigation, aircraft configuration changes, communication with Air Traffic Control, congested airspace, and degraded weather conditions.

This combination of high workload and the increased potential for unanticipated events can create a complex interplay of contributing factors, which may lead to an accident.

Accident distribution per flight phase 2005-2025



Accidents by Accident Category

The biggest cause of fatal accidents over the last 20 years was Loss Of Control In-flight (LOC-I).

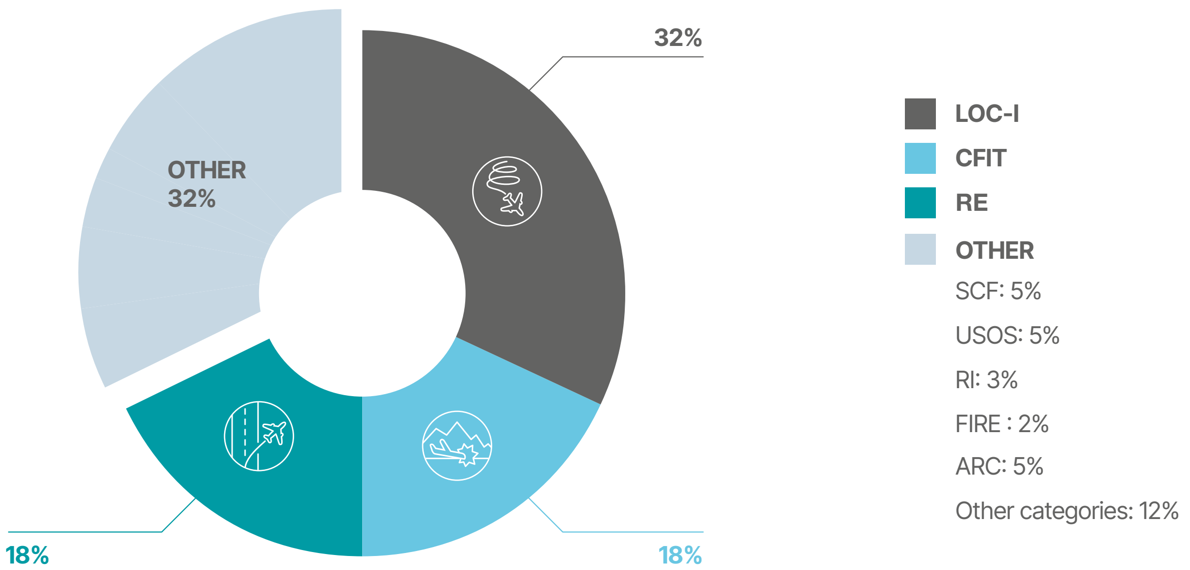
LOC-I accidents have significantly reduced for generation 4 aircraft enabled by fly-by-wire technologies.

CFIT accidents are the second largest category of accidents. The number of these accidents is decreasing with the continued development of navigation and Terrain Awareness and Warning System (TAWS) technologies, which are available on both generation 3 and generation 4 aircraft.

Runway Excursions (RE), including lateral and longitudinal types, are the third major cause of fatal accidents and the primary cause of hull losses. Emerging technologies, both energy-based and performance-based, show promising trends for preventing longitudinal RE accidents.

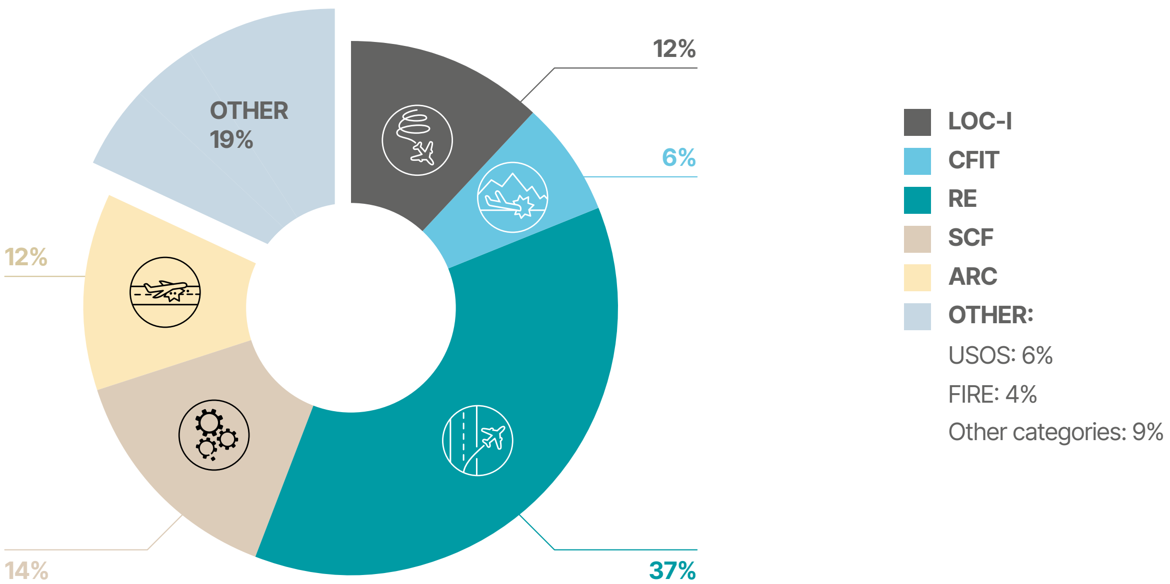
Fatal

Fatal accident distribution per accident category 2005-2025



Hull loss

Hull loss accident distribution per accident category 2005-2025



Evolution of the Main Accident Categories

The fatal accident rate for CFIT accidents reduced by 94%, and the LOC-I fatal accident rate reduced by 72%.

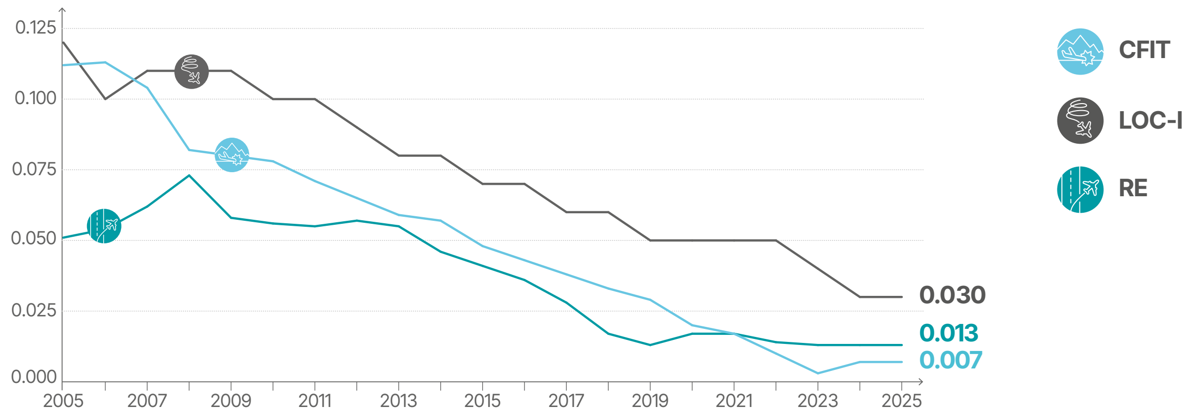
The proportion of flights flown by aircraft equipped with Flight Management System (FMS) and Terrain Awareness and Warning System (TAWS) technologies, which help to prevent CFIT accidents, has grown from 68% to 99% over the last 20 years.

59% of all flights in 2025 were made using generation 4 commercial jet aircraft equipped with fly-by-wire enabled technologies. The rate of LOC-I accidents is 91% lower for generation 4 aircraft when compared with generation 3 aircraft. As the proportion of flights made using generation 4 aircraft continues to grow, the rate of LOC-I accidents is expected to further decrease.

New technologies to address the causes of RE accidents were first deployed on Airbus aircraft in 2007. The number of Airbus aircraft equipped with RE prevention technologies today represents approximately 18% of the in-service fleet, contributing to the overall decreasing trend for hull losses due to RE accidents

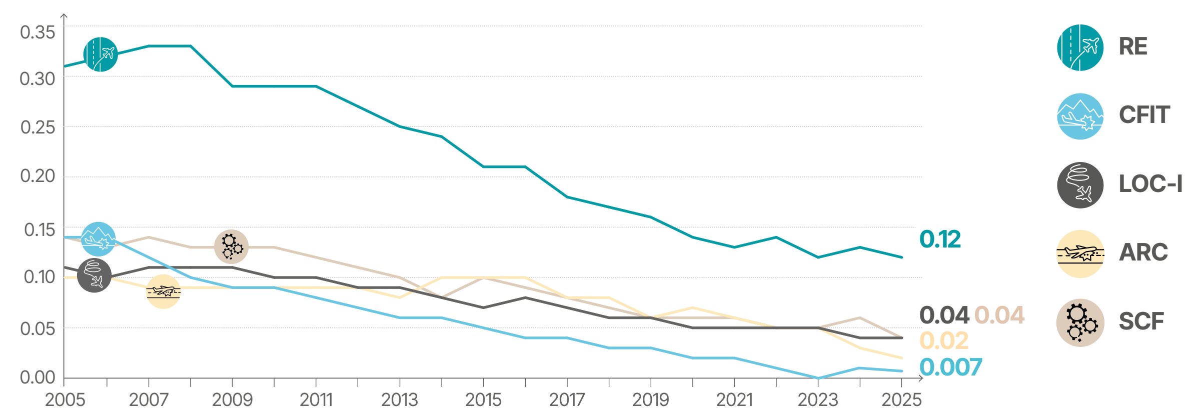
Fatal

10-year moving average fatal accident rate (per million flights) per accident category



Hull loss

10-year moving average hull loss accident rate (per million flights) per accident category



Controlled Flight Into Terrain (CFIT) Accident Rates

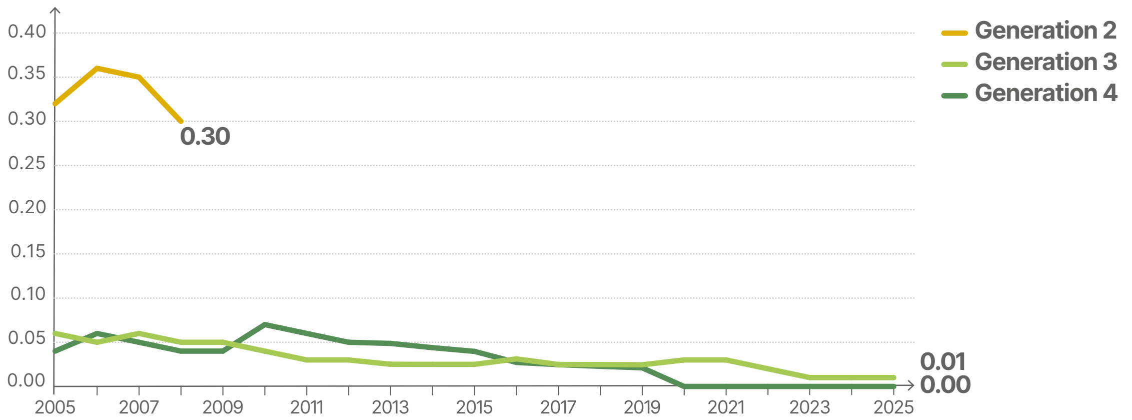
The introduction of glass cockpits, FMS, and TAWS on generation 3 aircraft has helped to reduce the CFIT fatal accident rate by 87% compared with generation 2 aircraft.

Technologies to reduce CFIT were introduced progressively with the Terrain Awareness and Warning System (TAWS). Glass cockpits installed on generation 3 aircraft improved navigation performance due to the introduction of a Flight Management System (FMS) and navigation displays that helped to further reduce the CFIT accident rates.

There were no fatal or hull loss CFIT accidents recorded for generation 4 aircraft in the last decade. Therefore, the 10-year moving average rate is zero for this generation in 2025.

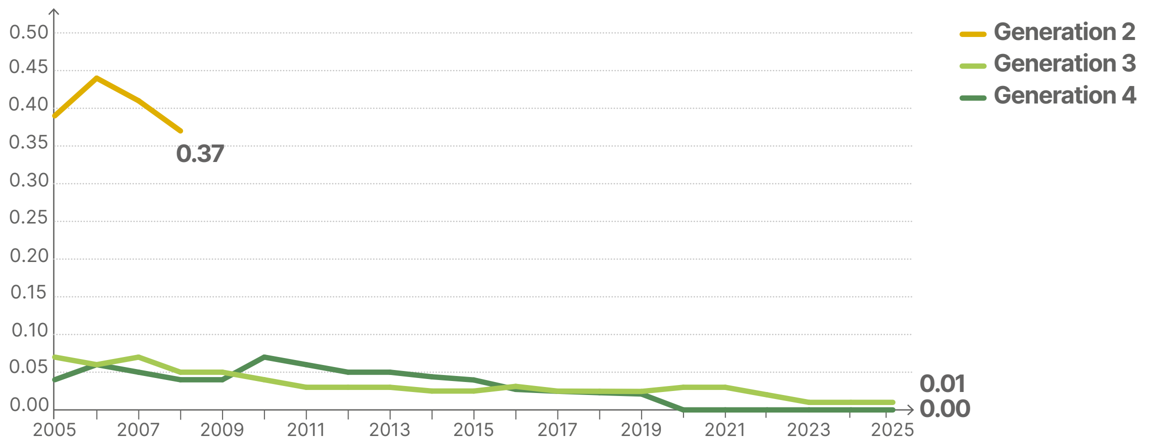
Fatal

10-year moving average CFIT fatal accident rate (per million flights) per aircraft generation



Hull loss

10-year moving average CFIT hull loss accident rate (per million flights) per aircraft generation



Loss Of Control In-flight (LOC-I) Accident Rates

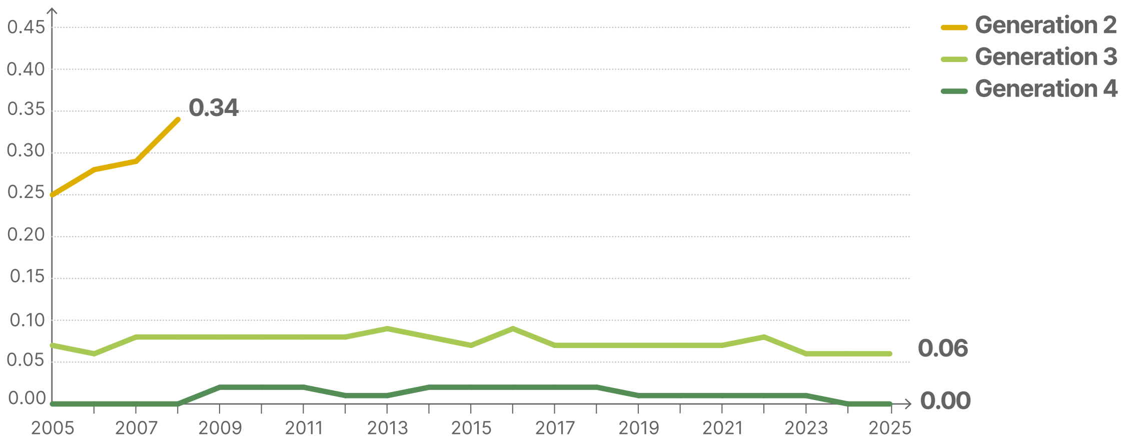
Flight envelope protection introduced with generation 4 aircraft has helped reduce LOC-I fatal accident rates by 91% compared with generation 3.

Generation 4 aircraft have accumulated over 30 years of in-service experience since the A320 aircraft first entered into service in 1988. This represents more than 293 million accumulated flights by the end of 2025, which is a strong statistical basis illustrating the significant safety benefit of fly-by-wire enabled and flight envelope protected aircraft to address LOC-I accidents.

There were no fatal LOC-I accidents recorded for generation 4 aircraft in the last decade. Therefore, the 10-year moving average rate is zero for this generation in 2025. The rate of LOC-I hull loss accidents is 89% lower for generation 4 aircraft when compared with generation 3 aircraft.

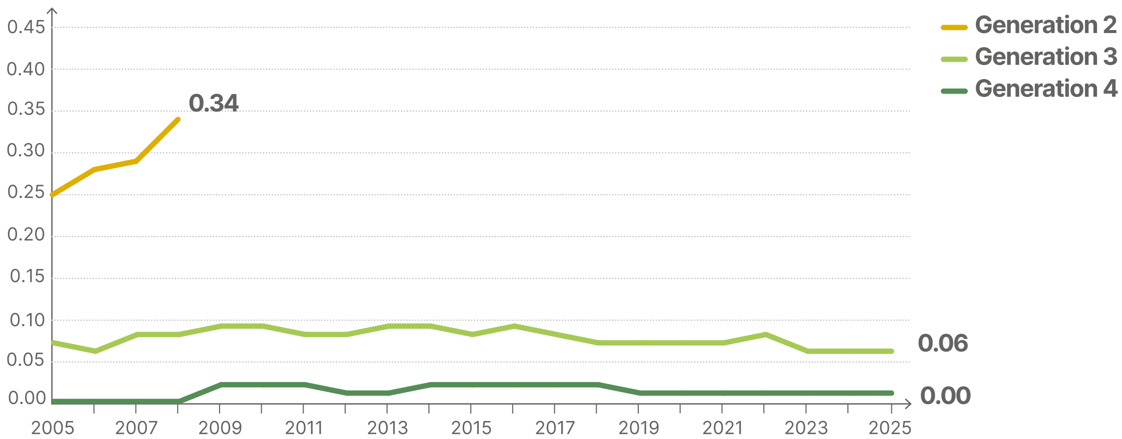
Fatal

10-year moving average LOC-I fatal accident rate (per million flights) per aircraft generation



Hull loss

10-year moving average LOC-I hull loss accident rate (per million flights) per aircraft generation



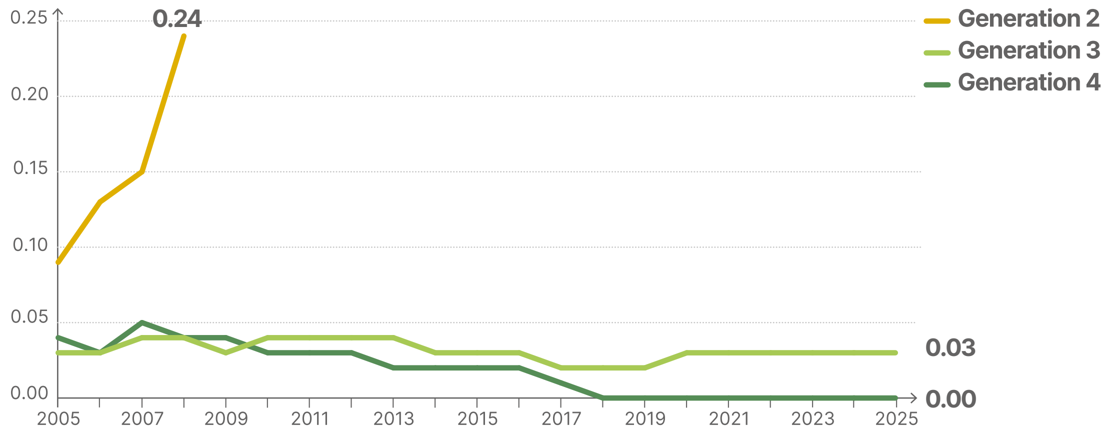
Runway Excursion (RE) Accident Rates

Technologies to reduce RE accidents have been available for over 18 years.

Most longitudinal RE accidents are related to aircraft energy management. An improvement in RE accident rates should be expected with the introduction of real-time energy and landing performance-based warning systems, such as the Runway Overrun Prevention System (ROPS) available for Airbus aircraft. In 2025, the number of aircraft equipped with ROPS increased to 18% of the worldwide fleet.

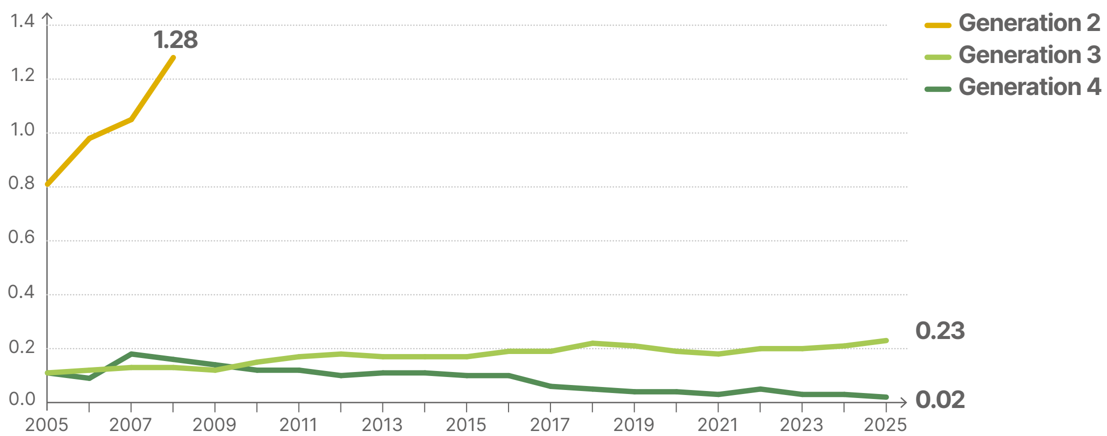
Fatal

10-year moving average RE fatal accident rate (per million flights) per aircraft generation



Hull loss

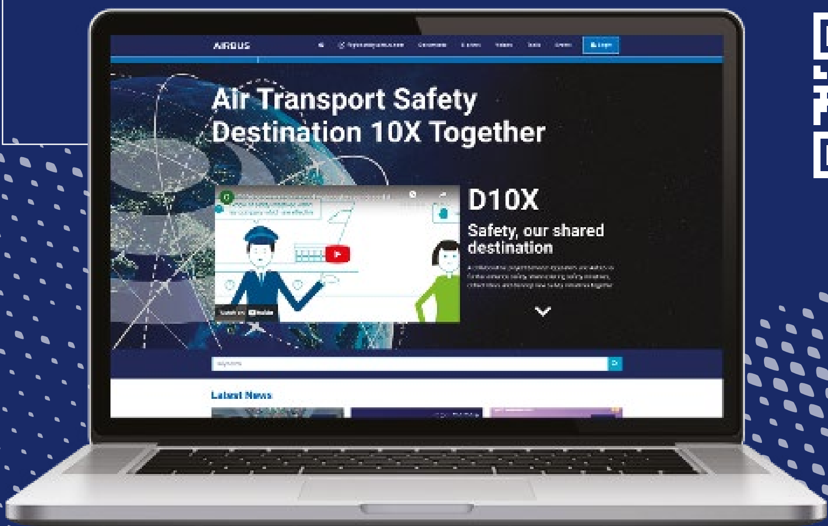
10-year moving average RE hull loss accident rate (per million flights) per aircraft generation



Air Transport Safety
Destination 10X Together

> Safety, our shared destination

A collaborative project between Operators and Airbus to further enhance safety, share existing safety initiatives, collect ideas, and develop new safety initiatives together.



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