Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

STATISTICAL SUMMARY

Air transportation occurrences in 2022

Canada

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Statistical summary: air transportation occurrences in 2022

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Statistical summary
Air transportation occurrences in 2022

The Transportation Safety Board of Canada (TSB) gathers and uses transportation occurrence[1] data during the course of its investigations to analyze safety deficiencies and identify risks in the Canadian air transportation system.

This statistical summary serves to describe the accident, incident, and injury counts that are presented in the included Tables. It provides limited discussion and some context but is not intended to be an in-depth analysis of the data.

It should be noted that certain characteristics of the data constrain statistical analysis and identification of emerging trends. These include the small totals of accidents and incidents, the large variability in the data from year to year, and changes to regulations and definitions. The reader is cautioned to keep these limitations in mind when reading this summary to avoid drawing conclusions that cannot be supported by statistical analysis.

Throughout this document, there are instances where categories of occurrences sum to more than the total number of occurrences. For example, if a single occurrence involves an airplane[2] and a glider, the occurrence count will increase by one in each aircraft category but the occurrence itself will be counted only once in the total of occurrences.

The 2022 data were collected according to the reporting requirements described in the *Transportation Safety Board Regulations* in force during that calendar year.

The statistics presented here reflect the TSB Aviation Safety Information System (ASIS) database at 13 March 2023. Since the occurrence data are constantly being updated in the live database, the statistics may change slightly over time.

Also, as many occurrences are limited to data gathering, information recorded on some occurrences may not have been verified.

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1 See Definitions section.

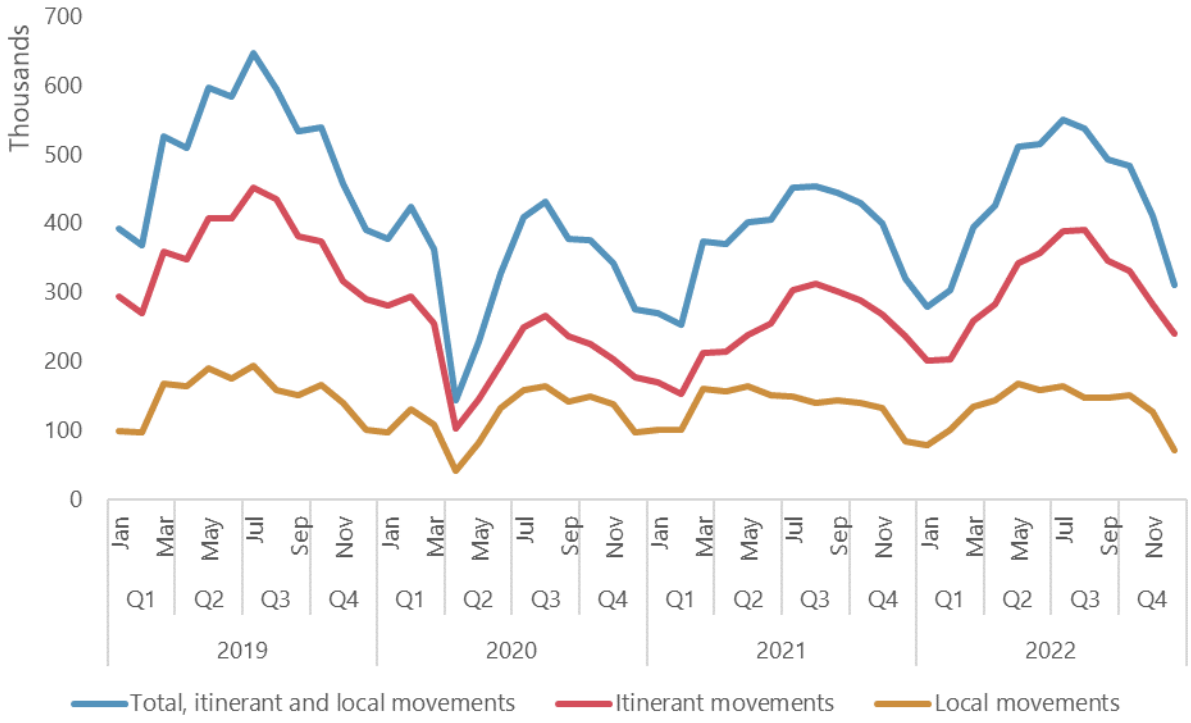
2 The term "airplane" is synonymous with Transport Canada's term "aeroplane" and will be used throughout the document for simplicity.

COVID-19 impacts on civil aviation in Canada

Air transportation in Canada slowly reverted to more normal patterns during 2022, after 2 years of significant disruption. As the year progressed, demand for business and vacation travel increased, while cargo activity remained high. Information collected by Statistics Canada indicates that total aircraft movements (take-offs and landings) at Canada's major and select small airports numbered 5.2 million. This was 14.1% higher than in 2021 and represented 84.9% of the pre-pandemic movements in 2019. The emergence of the Omicron variant of COVID-19 in the first half of 2022 brought renewed travel restrictions that decreased aircraft movements. However, built-up demand for international travel was high by the end of 2022. Movements for the year might have been slightly higher had it not been for significant winter weather, which caused disruptions across Canada in December.

While activity at Canada's major and select small airports is documented, it is more difficult to estimate the amount of activity—commercial or private—at many small airports in Canada or off-airport entirely. Therefore a full picture of activity in the aviation industry is lacking. Nonetheless, the activity patterns discussed here are indicative, and give partial context to the accident statistics presented in this document.

Figure 1. Total aircraft movements at major and selected small airports, by class (Source: Statistics Canada)[3]



[3] Statistics Canada. Table 23-10-0296-01 Aircraft movements, by class of operation, airports with NAV CANADA services and other selected airports, monthly. DOI: doi.org/10.25318/2310029601-eng (last accessed on 5 April 2023).

Figure 2. Passengers carried, major Canadian air carriers (Source: Statistics Canada)[4]

[4] Statistics Canada. Table 23-10-0079-01 Operating and financial statistics for major Canadian airlines, monthly. DOI: doi.org/10.25318/2310007901-eng (last accessed on 5 April 2023).

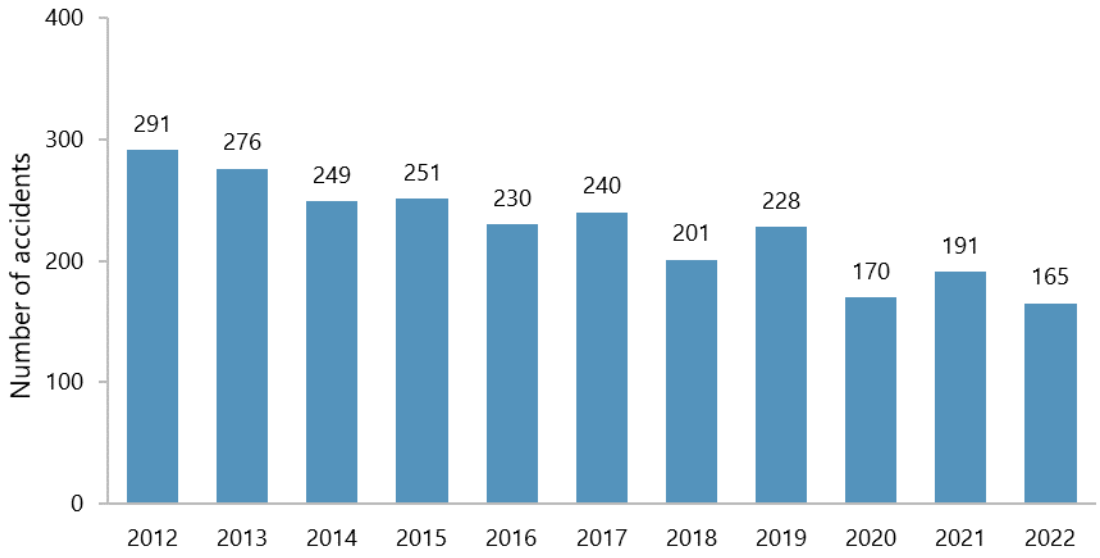
Overview of accidents and fatalities

Accident counts

Air transportation occurrences (both accidents and incidents)[5] are reportable to the TSB if they occur in Canada. Occurrences that take place outside of Canada are also reportable if they involve Canadian-registered aircraft, and meet the criteria laid out in the TSB Regulations.[6]

In 2022, a total of 165 air transportation accidents were reported to the TSB (Table 1 and Figure 3). This number is 14% lower than the previous year's total of 191 accidents and 29% below the yearly average of 233 accidents reported in the prior 10 years, 2012 to 2021. Most (152) of the accidents in 2022 took place in Canada and involved Canadian-registered aircraft. Seven accidents involving Canadian-registered aircraft took place outside Canada, and 6 accidents in Canada involved a foreign-registered aircraft. In general, the number of air transportation accidents has been decreasing in the last decade.

Figure 3. Reported air transportation accidents, 2012 to 2022



There were 145 accidents involving Canadian-registered aircraft (excluding ultralights) in 2022 (Table 2). This is 15% below the 2021 count of 170 accidents, and 28% below the average of 203 accidents in the preceding 10 years (2012 to 2021). If the 15 accidents involving ultralights are included in the count, there were 160 accidents involving Canadian-registered aircraft in 2022.

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5 See Definitions section.

6 *Transportation Safety Board Regulations*, at https://laws-lois.justice.gc.ca/eng/regulations/SOR-2014-37/index.html (last accessed on 27 March 2023).

Aircraft type

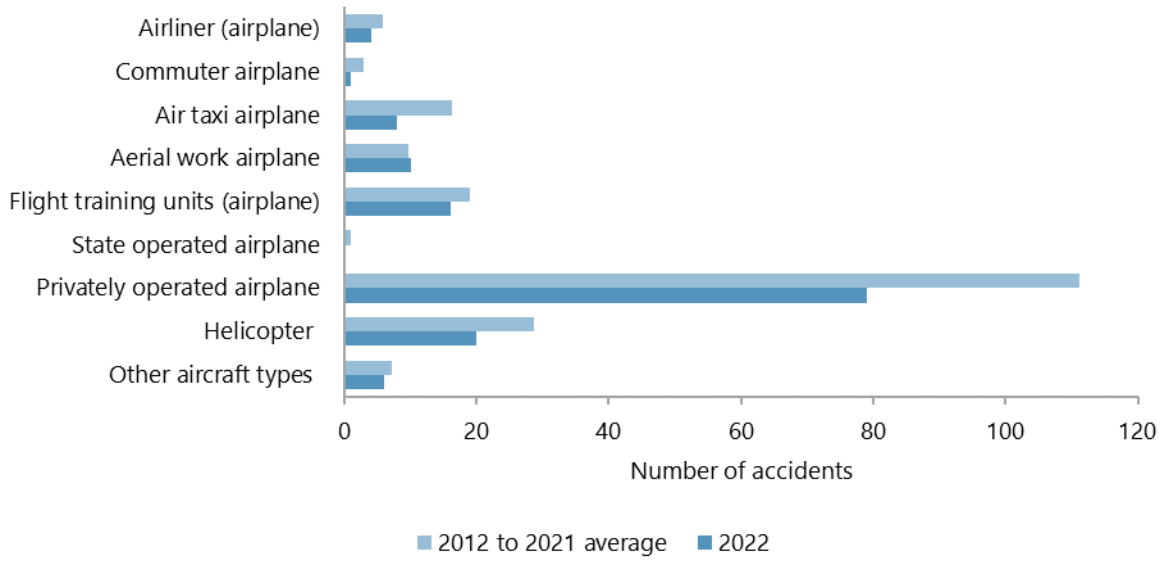
Of the 165 air transportation accidents reported to the TSB in 2022, 125 (76%) involved fixed-wing, powered airplanes (other than ultralights) (Table 1), 20 (12%) involved helicopters, 15 (9%) involved ultralights, and 6 accidents (4%) involved all other types of aircraft, such as balloons, gyroplanes, gliders, airships, hang gliders, or Unmanned Aerial Vehicles (UAVs). In the 10 years from 2012 to 2021, the average proportion of accidents involving each of these four categories of aircraft has remained fairly constant: airplanes have been involved in roughly 75% of reportable accidents each year, helicopters in about 12% of accidents, ultralights in about 10%, and other aircraft in about 3% of accidents each year.

Operator type

There were 56 accidents that involved commercially-operated aircraft of all types in 2022 (Table 1). This is 11% fewer than the 63 such accidents recorded in 2021, and 26% below the average of 76 accidents recorded in the 10 years from 2012 to 2021.

Commercially-operated Canadian-registered airplanes were involved in 39 accidents in 2022 (Table 2 and Figure 4). Of those, 4 involved operations under *Canadian Aviation Regulations* (CARs) Subpart 705, which certificates the operation of airliners. This is equal to the 4 accidents involving Canadian-registered airliners in 2021, and below the average of 6 accidents per year recorded from 2012 to 2021. In 2022, the TSB opened a class 3 investigation (A22C0093) into one of the four accidents in that year that involved airliners.[7] Information gathered to date suggests that this was a hard landing and a tail strike.

Figure 4. Accidents involving Canadian-registered aircraft, excluding ultralights, by aircraft type and operation type in 2022, compared with the 2012 to 2021 average



[7] For an explanation of the different occurrence classifications, see the TSB Policy on Occurrence Classification at https://bst-tsb.gc.ca/eng/lois-acts/evenements-occurrences.html (last accessed on 12 April 2023).

Also in 2022, there was 1 accident involving a Canadian-registered commuter airplane operating under CARs Subpart 704 (Table 2), as well as 12 accidents involving air taxi operations (CARs Subpart 703)—8 involving airplanes and 4 involving helicopters. These 12 air taxi accidents are fewer than the 18 reported in 2021, and remain well below the average of 26 accidents per year occurring between 2012 and 2021. Flight training units operating under CARs Subpart 406 were involved in 17 accidents in 2022, of which all involved airplanes except for 1 which involved a helicopter and 1 an advanced ultralight. On average for the period 2012 to 2021, flight training units were involved in about 19 airplane and 1 helicopter accidents per year.

Overall in 2022, 107 air transportation accidents involved non-commercial (i.e., private aircraft) operations (Table 1), compared to 127 in the preceding year. The 2022 total is 30% below the annual average of 152 accidents from 2012 to 2021. Of the 107 total accidents in the non-commercial (private aircraft) operations category, 79 involved Canadian-registered airplanes (Table 2), with no accidents in 2022 involving an airplane operating under CARs Subpart 604 having a Private Operator Registration Document (PORD).

Most operators of non-commercial (private) Canadian-registered aircraft are classified as recreational. Recreational operators are responsible for a significant amount of flying activity, and tend to be involved in many accidents each year. In 2022, 100 accidents involved recreational operators of Canadian-registered aircraft—78 of them in fixed-wing airplanes (Table 2), 5 in helicopters, and 17 in other aircraft. These 100 accidents are 19% fewer than in the preceding year, and 29% fewer than the 141 such accidents seen on average between 2012 and 2021.

In addition to commercial and private operations, 2 accidents in 2022 were categorized as having other or unknown operation types (Table 1).

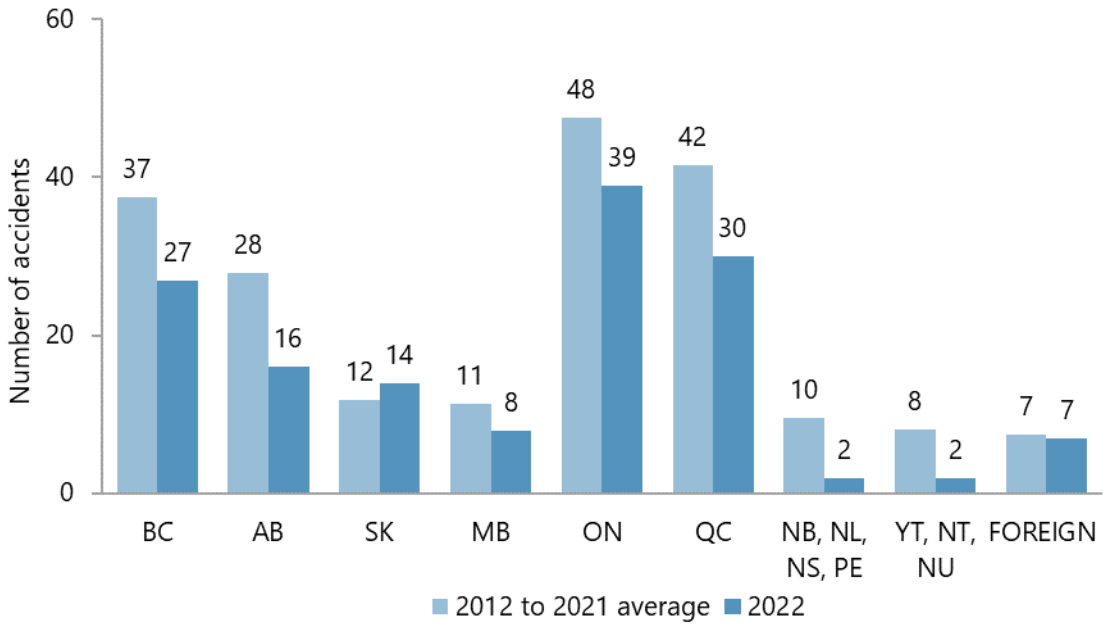
Province or territory

Ontario, with 48 reported accidents (all aircraft types, including ultralights), was the province with the largest number of reported accidents in 2022, surpassing Quebec with 33 (Table 7). Ontario averaged more accidents per year (57) in the 2012–2021 period than any other province or territory, with Quebec having the second-largest average accident count (49) for the same period. British Columbia and Alberta also have high average accident counts compared with the remaining provinces and territories.

Altogether, 7 accidents that were reportable under TSB Regulations occurred outside Canada in 2022. These all involved fixed-wing airplanes: 4 were operating commercially and 3 privately. While these 7 accidents were more than the 6 observed in 2021, that is fewer than the average of 8 per year for the period 2012 through 2021.

Focusing on Canadian-registered aircraft (excluding ultralights), most provinces saw fewer accidents reported in 2022 than the average of the previous 10 years (Table 8 and Figure 5). Saskatchewan, with 14 accidents reported for the year, was the only location to have more accidents than the 10-year average (of 12).

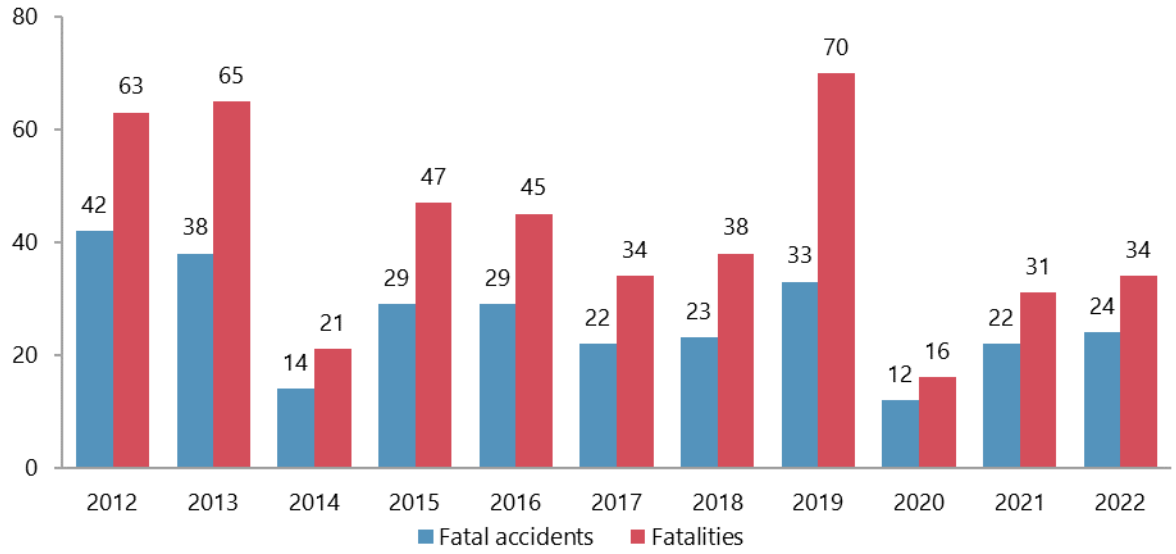
Figure 5. Air transportation accidents involving Canadian-registered aircraft, excluding ultralights, in 2022 compared with the 2012–2021 average, by province or territory



Fatal accidents, fatalities, and serious injuries

The TSB recorded 24 fatal air transportation accidents resulting in 34 fatalities in 2022 (tables 1 and 4, and Figure 6). This is slightly more than the 22 fatal accidents resulting in 31 fatalities in 2021, but is still 9% below the average of 26 fatal accidents involving 43 fatalities over the ten years from 2012 to 2021. Of the 24 fatal accidents in 2022, 16 involved fixed-wing, powered airplanes, 3 involved helicopters, 4 involved advanced ultralight aircraft, and 1 involved a glider. Twenty-two of these occurrences involved Canadian-registered aircraft and all occurred in Canadian airspace. Two occurrences involved U.S.-registered airplanes operating privately in Canada.

Figure 6. Fatal accidents and fatalities involving Canadian-registered aircraft, 2012 to 2022



Ten of the 34 air transportation fatalities in 2022 involved commercial operations (Table 4): 3 of them under air taxi regulations (CARs 703), 6 under aerial work regulations (CARs 702), and 1 under flight training unit regulations (CARs 406). There were no fatalities involving airliner operations (CARs 705), or commuter operations (CARs 704) in 2022. The remaining 24 (of 34) fatalities in 2022 were linked to privately registered aircraft and involved recreational operators. None of these involved an operator holding a Private Operator Registration Document (PORD) (CARs 604).

With regards to type of aircraft, 25 of 34 fatalities in 2022 resulted from accidents in fixed-wing powered airplanes (Table 4). Helicopter accidents resulted in 3 fatalities, ultralight accidents accounted for 5, and a glider for 1 death. Of the 34 total fatalities, 24 were crew members and 10 were aircraft passengers. There were no fatalities among persons on the ground in 2022.

Overall, 35 persons received serious injuries in aircraft accidents in 2022 (Table 5), which is 9 fewer than the 44 persons seriously injured in 2021, but 14% above the average of 31 in the period 2012 to 2021. Eleven persons received serious injuries in accidents involving commercial operations in 2022: 3 in airliners (CARs 705), none in a commuter aircraft (CARs 704), 4 in the air taxi sector (CARs 703), 4 in aerial work operations (CARs 702), and none with a flight-training unit (CARs 406). Also during 2022, 24 persons incurred serious injuries in recreational operations.

Accident rate

Accident rate as a key safety indicator

A key indicator of air transportation safety is the aircraft accident rate, which is calculated as the number of accidents per hours flown or per number of aircraft movements (a movement can be a takeoff or a landing). Analyzing trends of accident rates for different types of operators can signal emerging safety issues associated with specific operator types and activities.

Activity data (e.g., flight hours) broken out by operator type[8] are required to calculate accident rates that enable trend analysis of specific operator types over time, or support comparisons across operator types or geographical regions.

Until 2010, Transport Canada provided activity data broken out by operator type, and the TSB used these data to calculate and publish accident rates across operator types. From 2010 onward, Transport Canada no longer provided hours-flown activity data breakouts by operator type, because of its concerns regarding the accuracy of those data, which, for some operators that operated under more than one subpart of the CARs, were collectively reported only under the most restrictive CARs subpart. For 2022, Transport Canada was unable to provide any data about hours flown by Canadian-registered aircraft. As such, the TSB cannot calculate an accident rate for Canadian-registered aircraft by hours flown, either for the whole fleet or any part of it, in 2022.

In 2019, Statistics Canada changed the way it collected data about aircraft movements at airports in Canada. For the calendar years 2020 and 2021 the TSB was not able to report an accident rate by number of aircraft movements in Canada. However, estimates of aircraft movements for those years are now available, and this report provides a global accident rate for aircraft operating in Canada based on a survey of all major and selected minor airports in Canada. While this estimate includes the bulk of aircraft movements in Canada, there is a significant gap in our ability to measure activity that takes place at small airports or away from airports entirely.

Because movement data are currently not categorized by CARs subpart when tabulated by Statistics Canada, there is no differentiation between sectors (e.g., air-taxi operators versus airline operators) or between different types of aircraft (such as airplane, helicopter, or floatplane). Therefore, accident rates cannot be calculated for individual sectors of the industry.

Without hours-flown or movement data that are categorized by CARs subpart and aircraft type, it will be more difficult for sector stakeholders to assess risks and determine if mitigation strategies being carried out to improve safety are actually working.

Therefore, in 2019 the Board recommended that

> the Department of Transport require all commercial operators to collect and report hours flown and movement data for their aircraft by *Canadian Aviation Regulations* subpart and aircraft type, and that the Department of Transport publish those data.
>
> **TSB Recommendation A19-05**

Accident rate per 100 000 aircraft movements in Canada, for Canadian and foreign-registered aircraft

Overall accident rate

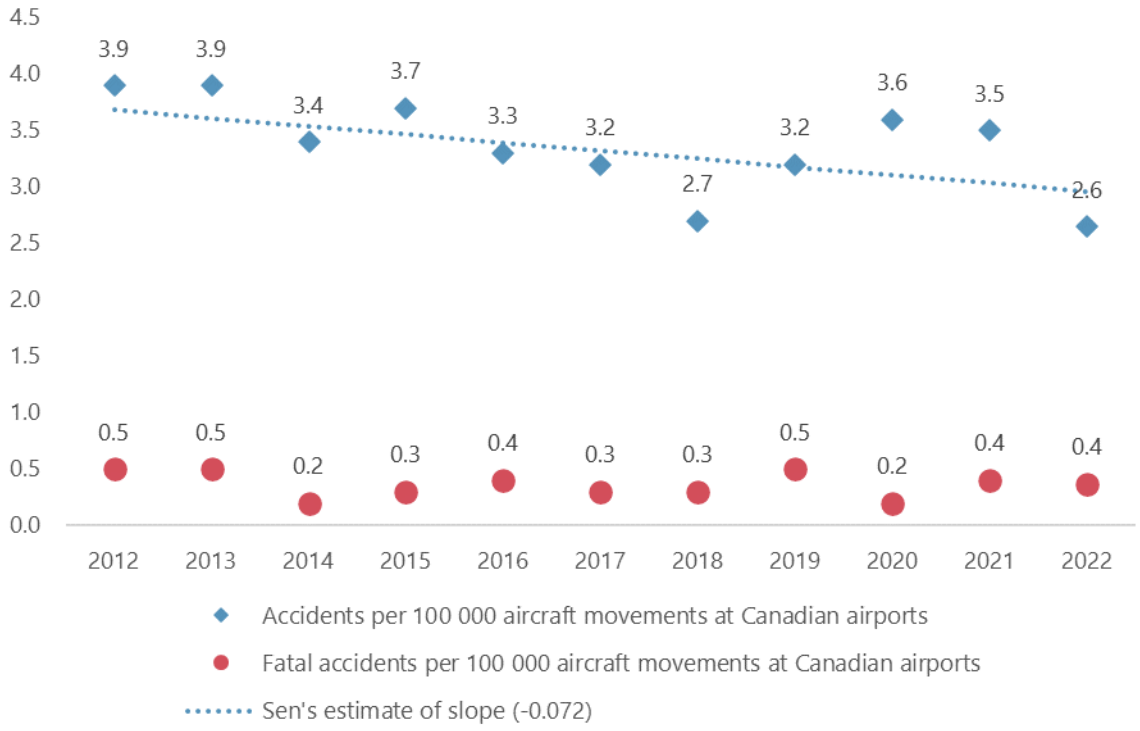
Statistics Canada collects information about the number of aircraft movements that take place at major and select small airports in Canada. The 2022 overall air transportation accident rate of 2.6 per 100 000 aircraft movements (Table 3) was calculated based on the 138 accidents (14% fewer than in 2021) in

[8] The operator types in the CARs are: airline operations (Subpart 705), commuter operations (Subpart 704), air-taxi operations (Subpart 703), aerial work (Subpart 702), foreign air operations (Subpart 701), and private operators (Subpart 604).

Canada involving Canadian-registered and foreign airplanes and helicopters (ultralights and other aircraft types are excluded), and the estimated 5 211 000 aircraft movements at Canadian airports (14% more than in 2021). This rate is the lowest accident rate (by movements) that the TSB has recorded since 2003.

The accident rate for aircraft operating in Canada has been trending generally downward over the past 11 years. The accident rate has fallen from 3.9 accidents per 100 000 aircraft movements in 2012 to a low of 2.6 in 2022. To test whether the change in rate was statistically significant, Kendall's tau-b (τ_b) correlation and Sen's estimate of slope were used to quantify the trend in accident rate. Kendall's τ_b correlation coefficient is a nonparametric measure of the strength and direction of association that exists between two variables. Kendall's τ_b was calculated on the 11-year series of accident rate values by year from 2012 to 2022. There was a moderate, statistically significant negative correlation that indicates a downward trend in accident rate per 100 000 aircraft movements over the period ($\tau_b = -0.4909$, $p = 0.0356$). Sen's estimate of slope, the amount of downward rate change per year, was -0.072 occurrences per 100 000 aircraft movements per year. A graphical illustration is presented in Figure 7.

Figure 7. Airplane and helicopter accidents per 100 000 aircraft movements at Canadian airports



Fatal accidents

Figure 7 also shows rate data for fatal accidents. For the 19 fatal accidents in Canada involving Canadian- and foreign-registered airplanes and helicopters in 2022 (ultralights and other aircraft types are excluded), the fatal accident rate was 0.4 per 100 000 aircraft movements, which is equal to the 2021 rate and also the 2012 to 2021 average of 0.4 fatal accidents per 100 000 aircraft movements. There is no statistically significant change in the fatal accident rate since 2012 (Kendall's $\tau_b = -0.2000$, $p = 0.3918$).

Fatalities

In 2022, 28 fatalities resulted from accidents in Canada involving Canadian- and foreign-registered airplanes and helicopters (excluding ultralights and other aircraft types), yielding a rate of 0.5 fatalities per 100 000 aircraft movements. This fatality rate is lower than the 2021 rate of 0.6, and equivalent to the average yearly rate between 2012 and 2021. There is no statistically significant trend (neither upward nor downward) in the fatality rate since 2011 (Kendall's $\tau_b = -0.2364$, $p = 0.3115$) (data not shown).

Dangerous goods released

The TSB recorded 7 accidents in 2022 involving a release of dangerous goods (Table 1). This is above the average of 5 per year over the previous 10 years.

Accident events and phases

For each reported accident, the TSB records one or more safety-significant events that occurred, and the phase of flight for each of these events. For example, if an airplane suffers engine power loss during takeoff (safety-significant event 1), and then returns to land and has a runway excursion during landing (safety-significant event 2), each of the two events and their phase of flight will be recorded for statistical purposes. Tables 11 through 14 show, by phase of flight, how many accidents occurred for each event category, from 2012 to 2022. Note that if a single accident involves more than one event within a phase of flight, that accident is only counted once in the phase total. Therefore, the total number of accidents for each event within a phase will not necessarily sum to the total number of accidents for a phase. For example, in the "takeoff" phase, if an accident involves both "loss of control" and "power loss" events, the accident is counted once in each event category within the phase, but only once in the overall phase total. As well, approximately 30% of accidents from 2012 to 2022 involved events in more than one phase of flight, so the number of accidents shown in the tables, and in figures 8 and 9, sum to more than the total number of accidents.

Figures 8 and 9 and Tables 11 and 12 show the number of airplane and helicopter accidents by phase of flight and event category during the period 2012 to 2022. Compare those counts with the total number of airplane accidents (1866) and helicopter accidents (309) in the same period (Table 1). It is obvious that the largest number of accidents involve events that happen during the landing (1057) and takeoff (457) phases of flight (Table 11 and Figure 8). Similarly, helicopter accidents (Table 12 and Figure 9) have events that occur most often during the landing (142), manoeuvring[9] (82), and takeoff (63) phases of flight. Note that for airplanes, although the landing phase produces the largest outright number of accidents, fatal accidents happen most often during the en-route (63) and takeoff (54) phases, not including post-impact events (Table 13 and Figure 8). Furthermore, the manoeuvring phase was associated with the largest proportion of fatal accidents (39 of 119, or 33%). Similarly, for helicopters, the en route (19) and manoeuvring (17) phases are linked to more fatal accidents in the 11-year period than are the approach (4) and landing (7) phases of flight (Table 14 and Figure 10).

9 Manoeuvring (i.e., low altitude/aerobatic flight operations) does not occur on all flights.

Figure 8. Airplane accidents having events in selected phases of flight, 2012 to 2022

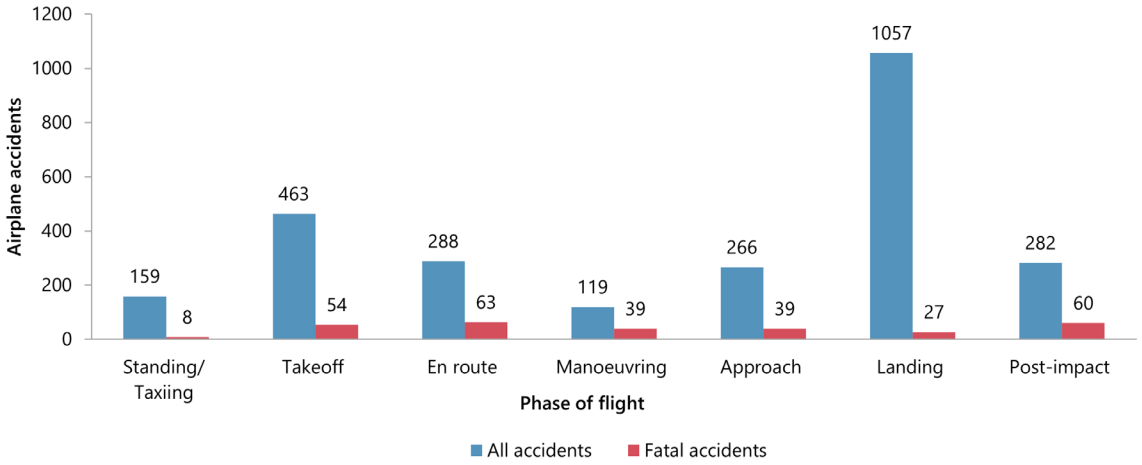
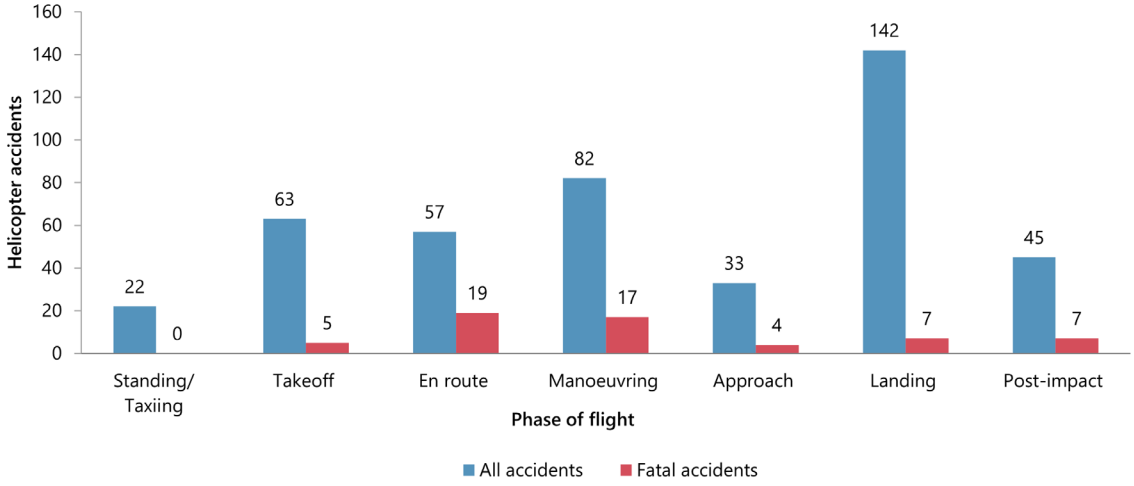


Figure 9. Helicopter accidents having events in selected phases of flight, 2012 to 2022



Overview of incidents

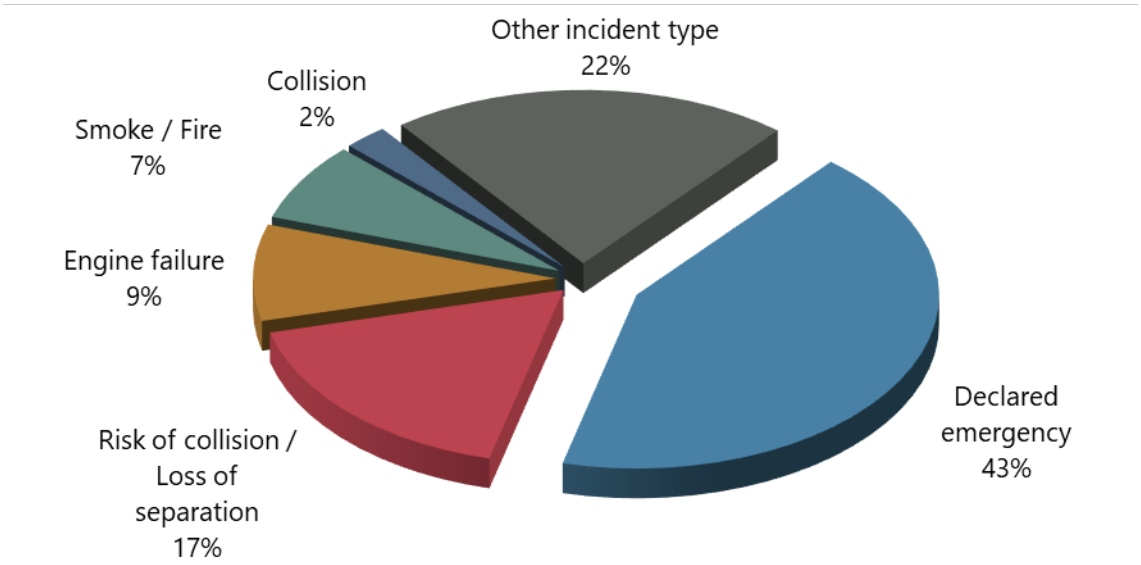
Incident counts

In 2022, 724 air transportation incidents of all types were reported in accordance with the TSB Regulations (Table 9). This represents an increase of 45% from the 500 that were reported in 2021, and is just 1% below the average of 733 incidents recorded per year between 2012 and 2021. Prior to 2020, incident counts had been generally increasing, which reflected both an increase in commercial flying activity and the introduction of new TSB reporting regulations that became effective July 1, 2014. Under these reporting requirements, air transportation incidents to be reported to the TSB were expanded to include aircraft with a maximum certificated takeoff weight greater than 2250 kg (formerly 5700 kg) and aircraft being operated with an air operator certificate issued under CARs Part VII—Commercial Air Services. At the onset of the COVID-19 pandemic in early 2020, both commercial flying activity and the number of reported incidents were greatly reduced.

Overall, 2022 saw a continued return toward pre-pandemic levels of commercial air traffic in Canada,[10] accompanied by an increase in reported air transportation incidents to pre-pandemic numbers. While declared emergency (310 incidents) is still the most frequently reported incident category in 2022 (Table 9 and Figure 10), it should be noted that this is something of a catch-all category for incidents where an emergency is declared and no other primary category (as set out in the TSB Regulations) applies. Risk of collision / loss of separation (ROC/LOS) incidents (124) doubled in frequency compared to 2021, and represented about 17% of all incidents in 2022. Incidents involving engine failure (65) declined in 2022 to about 9% of all incidents. Amongst the remaining incident types, crew were reported to have been unable to perform their duties 47 times, or in 6% of all reportable incidents in the year, up from a low of 16 incidents (3%) in the previous year. This category includes both flight crew and cabin crew.

[10] Statistics Canada. Table 23-10-0269-01 Transportation activity indicators, Transport Canada DOI: https://doi.org/10.25318/2310026901-eng (Last accessed 29 March 2023).

Figure 10. Reported air transportation incidents, by type, 2022



The majority of air transportation incidents in 2022 (490 or 68%) occurred in Canada and involved Canadian-registered aircraft (Table 1). However, 173 incidents involving Canadian-registered aircraft occurred outside Canada in 2022. This count is close to the peak number of 181 seen in 2017 and again in 2019, and greatly exceeds the average of 98 per year in the 10 years from 2012 to 2021. Declared emergency and risk of collision/loss of separation (ROC/LOS) were the two most common incident types involving Canadian-registered aircraft outside of Canada (Table 1). Both of these incident types have increased in frequency in recent years. The TSB continues to monitor these trends moving forward.

The overall increase in reportable incidents is at least partially linked to improvements in reporting culture in the airline industry, the adoption of safety management systems by many smaller commercial operators (in addition to all of the major Canadian airlines), and the increased use of electronic flight bags and portable devices, which make it easier for pilots to report incidents.

In part due to reporting requirements laid out in the TSB Regulations, commercial operations were the source of 671 (93%) of the 724 incidents reported to the TSB in 2022 (Table 9). More than half (415, or 62%) of these involved Canadian-registered airliners operating under CARs Subpart 705 (airline operations) (tables 9 and 10). This is down from a peak of 614 in 2017, and 6% fewer than the average of 441 incidents per year from 2012 to 2021 that involved Canadian-registered airliners.

Foreign air operators (CARs 701) were involved in 55 incidents in 2022, or about 8% of all commercial incidents. This is below the levels recorded before the pandemic, despite the return to about 85% of pre-pandemic transborder and international passenger traffic.[11]

[11] Statistics Canada. Table 23-10-0269-01 Transportation activity indicators, Transport Canada DOI: https://doi.org/10.25318/2310026901-eng (Last accessed 12 April 2023).

Data tables

Table 1. Reportable air transportation occurrences, by type of occurrence, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Accidents	**291**	**276**	**249**	**251**	**230**	**240**	**201**	**228**	**170**	**191**	**165**
Accidents in Canada involving Canadian-registered aircraft	267	262	238	232	214	222	180	211	165	184	152
Accidents outside Canada involving Canadian-registered aircraft	8	4	4	10	8	11	11	8	5	6	7
Accidents in Canada involving foreign-registered aircraft	17	10	7	9	8	7	11	10	0	1	6
Accidents[1]	**291**	**276**	**249**	**251**	**230**	**240**	**201**	**228**	**170**	**191**	**165**
Commercial	92	84	82	74	63	97	66	83	54	63	56
Airliner (CARs 705)	5	7	4	9	1	9	8	7	4	4	4
Commuter (CARs 704)	5	3	2	3	3	5	1	4	3	1	1
Air taxi (CARs 703)	33	33	34	23	26	28	23	26	13	18	12
Aerial work (CARs 702)	26	21	17	18	16	18	17	21	13	22	19
Foreign air operator (CARs 701)	2	2	0	0	0	4	3	1	0	0	1
Flight training units (CARs 406)	19	17	25	20	17	32	13	25	20	18	17
Other commercial	3	1	1	1	1	2	1	0	1	0	2
Private	185	179	159	172	164	142	134	144	114	127	107
Private operators (CARs 604)	3	4	3	0	5	0	3	1	2	0	0
Recreational	181	175	156	165	152	135	126	137	109	124	103
Other private	1	0	0	7	8	7	7	6	3	3	4
State	3	6	4	1	0	0	2	1	1	1	0
Other/Unknown	12	9	5	5	3	2	0	0	1	1	2
Accidents[1]	**291**	**276**	**249**	**251**	**230**	**240**	**201**	**228**	**170**	**191**	**165**
Airplane	205	212	176	197	174	178	153	176	133	137	125
Helicopter	41	27	34	33	28	27	26	28	16	29	20
Ultralight	36	23	32	17	22	25	18	19	17	20	15
Other[2]	9	15	8	7	6	10	4	6	4	6	6
Aircraft involved in accidents[1,3]	**296**	**280**	**253**	**259**	**234**	**247**	**207**	**231**	**172**	**195**	**166**
Airplane	209	215	179	202	178	184	159	178	135	140	125
Helicopters	42	27	34	33	28	27	26	28	16	29	20
Ultralights	36	23	32	17	22	25	18	19	17	20	15
Other[2]	9	15	8	7	6	11	4	6	4	6	6
Fatal accidents[1]	**42**	**38**	**14**	**29**	**29**	**22**	**23**	**33**	**12**	**22**	**24**
Airplane	25	25	12	20	22	18	17	27	7	14	16
Helicopter	7	6	0	5	2	2	4	3	2	5	3
Ultralight	8	4	2	4	4	1	2	3	3	3	4
Other[2]	2	4	0	0	1	1	0	1	0	0	1
Persons fatally injured in reportable accidents	**63**	**65**	**21**	**47**	**45**	**34**	**38**	**70**	**16**	**31**	**34**
Persons seriously injured in reportable accidents	**48**	**22**	**35**	**31**	**18**	**33**	**28**	**31**	**18**	**44**	**35**
Accidents in Canada involving foreign-registered aircraft	**17**	**10**	**7**	**9**	**8**	**7**	**11**	**10**	**0**	**1**	**6**
Fatal accidents	1	2	2	3	1	0	0	4	0	0	2
Persons fatally injured	1	2	4	4	7	0	0	11	0	0	2
Persons seriously injured	4	0	1	0	0	0	4	1	0	0	2
Occurrences with a dangerous good release	**1**	**4**	**4**	**6**	**7**	**8**	**7**	**8**	**1**	**8**	**7**
Incidents[4]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Incidents in Canada involving Canadian-registered aircraft	482	541	599	653	620	685	608	654	319	402	490
Incidents outside Canada involving Canadian-registered aircraft	48	38	55	58	117	181	161	181	66	72	173
Incidents in Canada involving foreign-registered aircraft	138	129	102	106	117	106	115	113	43	30	70
Incidents[4]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Risk of collision / Loss of separation	102	115	94	111	139	172	141	138	49	62	124
Declared emergency	266	294	313	333	311	348	340	366	190	205	310
Engine failure	92	83	104	110	110	98	91	103	50	83	65
Smoke/Fire	71	67	89	87	85	100	99	91	25	44	53
Collision	5	15	16	8	18	24	26	31	8	7	17
Other	109	115	125	140	170	197	163	186	99	99	155

Data extracted 13 March 2023

[1] Breakdowns may not add up to totals. For example, when an occurrence involves an airplane and a helicopter, the occurrence is counted in each type, but only once in the total.

[2] Includes balloons, gyroplanes, gliders, airships, hang gliders, remotely piloted aircraft systems (RPAS), and similar aircraft types.

[3] "Aircraft involved in accidents" are aircraft counts, all other data are accident counts.

[4] Under the 2014 TSB Regulations, reportable aviation incidents include a) aircraft having a maximum certificated take-off weight greater than 2250 kg (formerly 5700 kg); b) aircraft being operated under an air operator certificate issued under the *Canadian Aviation Regulations*, Part VII.

Table 2. Air transportation occurrences involving Canadian-registered aircraft, by aircraft and operator type, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Accidents[1,2]	**239**	**243**	**212**	**227**	**200**	**208**	**173**	**200**	**153**	**170**	**145**
Airplane accidents	191	204	170	190	167	171	143	168	133	136	119
Commercial	62	58	55	51	42	71	46	66	45	43	39
Airliner (CARs 705)	5	7	4	9	1	9	8	7	4	4	4
Commuter (CARs 704)	5	3	1	3	3	5	1	4	3	1	1
Air taxi (CARs 703)	19	19	19	12	16	18	18	21	10	11	8
Aerial work (CARs 702)	14	12	8	10	7	12	6	11	8	9	10
Flight training units (CARs 406)	18	16	23	16	16	27	12	23	20	18	16
Other commercial	1	1	0	1	0	0	1	0	0	0	0
Private	122	139	111	138	122	101	96	101	88	93	79
Private operators (CARs 604)	0	3	1	0	5	0	3	1	2	0	0
Recreational	121	136	110	132	114	98	92	97	83	91	78
Other private	1	0	0	6	4	3	2	3	3	2	1
State	1	2	3	1	0	0	2	1	0	0	0
Other/Unknown	6	7	2	1	3	0	0	0	0	0	1
Helicopter accidents	41	27	34	32	27	27	26	27	16	29	20
Commercial	28	22	26	23	18	22	17	16	9	20	14
Private	10	4	7	9	9	5	9	11	6	9	6
State	2	1	1	0	0	0	0	0	1	0	0
Other/Unknown	2	0	0	0	0	0	0	0	0	0	0
Other aircraft accidents[3]	7	13	8	7	6	10	4	6	4	6	6
Fatal accidents[1,2]	**33**	**32**	**10**	**23**	**24**	**21**	**21**	**26**	**9**	**19**	**18**
Airplane accidents	25	24	10	18	21	18	17	23	7	14	14
Commercial	6	8	2	6	3	7	4	8	1	2	5
Airliner (CARs 705)	0	0	0	0	0	1	0	0	0	0	0
Commuter (CARs 704)	1	1	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	3	5	1	3	1	1	2	6	1	0	1
Aerial work (CARs 702)	2	1	1	2	1	2	2	1	0	2	3
Flight training units (CARs 406)	0	1	0	1	1	3	0	1	0	0	1
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	17	14	8	13	18	11	13	15	6	12	9
Private operators (CARs 604)	0	1	0	0	1	0	1	0	0	0	0
Recreational	17	13	8	13	16	10	13	15	6	12	9
Other private	0	0	0	0	1	1	0	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	2	2	0	0	0	0	0	0	0	0	0
Helicopter accidents	7	6	0	5	2	2	4	3	2	5	3
Commercial	5	6	0	4	1	2	1	1	1	4	2
Private	1	0	0	1	1	0	3	2	1	1	1
State	1	0	0	0	0	0	0	0	0	0	0
Other/Unknown	0	0	0	0	0	0	0	0	0	0	0
Other aircraft accidents[3]	1	3	0	0	1	1	0	1	0	0	1
Persons fatally injured[2]	**54**	**59**	**15**	**40**	**34**	**33**	**36**	**54**	**13**	**28**	**27**
Persons seriously injured[2]	**38**	**19**	**28**	**28**	**17**	**27**	**21**	**26**	**14**	**36**	**30**
Incidents[2,4]	**530**	**579**	**654**	**711**	**737**	**866**	**769**	**835**	**385**	**473**	**663**
Risk of collision / Loss of separation	92	105	84	101	127	159	134	128	48	61	122
Declared emergency	200	231	277	290	263	316	298	318	170	192	267
Engine failure	77	70	94	102	102	88	79	96	44	78	62
Smoke/Fire	59	55	76	79	75	95	85	83	21	41	48
Collision	4	14	15	7	16	23	21	27	8	7	17
Other	98	104	108	132	154	185	152	183	94	94	147
Accidents involving ultralight aircraft	**36**	**23**	**31**	**16**	**22**	**25**	**18**	**19**	**17**	**20**	**15**
Fatal accidents	8	4	2	3	4	1	2	3	3	3	4
Fatalities	8	4	2	3	4	1	2	5	3	3	5
Serious injuries	6	3	6	3	1	6	3	4	4	8	3

Data extracted 13 March 2023

[1] Breakdowns may not add up to totals. For example, when an occurrence involves an airplane and a helicopter, the occurrence is counted in each type, but only once in the total.

[2] Excludes ultralight aircraft.

[3] Includes balloons, gyroplanes, gliders, airships, hang gliders, remotely piloted aircraft systems (RPAS), and similar aircraft types.

[4] Under the 2014 TSB Regulations, reportable aviation incidents include a) aircraft having a maximum certificated take-off weight greater than 2250 kg (formerly 5700 kg); b) aircraft being operated under an air operator certificate issued under the *Canadian Aviation Regulations*, Part VII.

Table 3. Rate of accidents per 100 000 aircraft[1] movements, by Canadian- and foreign-registered aircraft in Canada, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Accidents	238	235	206	220	196	195	167	196	145	160	138
Fatal accidents	31	28	11	21	23	18	17	29	9	17	19
Fatalities	52	52	17	39	37	30	26	63	13	26	28
Aircraft movements[2] (thousands)	6,157	6,024	6,010	6,016	6,023	6,136	6,295	6,135	4,069	4,566	5,211
Accidents per 100 000 aircraft movements	3.9	3.9	3.4	3.7	3.3	3.2	2.7	3.2	3.6	3.5	2.6
Fatal accidents per 100 000 aircraft movements	0.5	0.5	0.2	0.3	0.4	0.3	0.3	0.5	0.2	0.4	0.4
Fatalities per 100 000 aircraft movements	0.8	0.9	0.3	0.6	0.6	0.5	0.4	1.0	0.3	0.6	0.5

Data extracted 13 March 2023

[1] Excluding ultralights, balloons, gyroplanes, gliders, airships, hang gliders and similar aircraft types.

[2] Statistics Canada. Table 23-10-0296-01 Aircraft movements, by class of operation, airports with NAV CANADA services and other selected airports, monthly. DOI: https://doi.org/10.25318/2310029601-eng; Table 23-10-0003-01 Aircraft movements, by civil and military movements, airports with NAV CANADA towers, monthly. DOI: https://doi.org/10.25318/2310000301-eng; Table 23-10-0010-01 Aircraft movements, by civil and military movements, airports with NAV CANADA flight service stations, monthly. DOI: https://doi.org/10.25318/2310001001-eng; Table 23-10-0016-01 Aircraft movements, by class of operation and type of operation, airports without air traffic control towers, monthly. DOI: https://doi.org/10.25318/2310001601-eng.

Table 4. Persons fatally injured in air transportation accidents, by type of operation, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Persons fatally injured	**63**	**65**	**21**	**47**	**45**	**34**	**38**	**70**	**16**	**31**	**34**
In Canada, involving Canadian-registered aircraft	61	57	15	39	35	32	28	57	16	29	32
Outside Canada, involving Canadian-registered aircraft	1	6	2	4	3	2	10	2	0	2	0
In Canada, involving foreign-registered aircraft	1	2	4	4	7	0	0	11	0	0	2
Persons fatally injured	**63**	**65**	**21**	**47**	**45**	**34**	**38**	**70**	**16**	**31**	**34**
Commercial	18	29	4	20	6	15	9	25	2	8	10
Airliner (CARs 705)	0	0	0	0	0	1	0	0	0	0	0
Commuter (CARs 704)	1	5	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	12	19	2	12	1	1	5	21	1	1	3
Aerial work (CARs 702)	3	4	2	6	2	7	4	3	1	7	6
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	1	1	0	2	3	5	0	1	0	0	1
Other commercial	1	0	0	0	0	1	0	0	0	0	0
Private	37	33	17	28	39	19	29	45	14	23	24
Private operators (CARs 604)	0	1	0	0	4	0	1	0	0	0	0
Recreational	37	32	17	28	27	17	29	43	14	23	24
Other private	0	0	0	0	8	2	0	2	0	0	0
State	1	0	0	0	0	0	0	0	0	0	0
Other/Unknown	7	3	0	1	0	0	0	0	0	0	0
Crew members fatally injured	**40**	**44**	**15**	**29**	**25**	**26**	**20**	**34**	**11**	**18**	**24**
Commercial	11	21	3	10	3	11	3	10	2	4	7
Airliner (CARs 705)	0	0	0	0	0	0	0	0	0	0	0
Commuter (CARs 704)	0	2	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	7	14	1	4	1	1	0	8	1	0	1
Aerial work (CARs 702)	2	4	2	4	1	4	3	1	1	4	5
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	1	1	0	2	1	5	0	1	0	0	1
Other commercial	1	0	0	0	0	1	0	0	0	0	0
Private	25	21	12	20	22	15	17	24	9	14	17
Private operators (CARs 604)	0	1	0	0	1	0	1	0	0	0	0
Recreational	25	20	12	20	18	14	17	22	9	14	17
Other private	0	0	0	0	3	1	0	2	0	0	0
State	1	0	0	0	0	0	0	0	0	0	0
Other/Unknown	3	2	0	1	0	0	0	0	0	0	0
Passengers fatally injured	**22**	**20**	**6**	**18**	**20**	**8**	**18**	**36**	**5**	**11**	**10**
Commercial	6	8	1	10	3	4	6	15	0	3	3
Airliner (CARs 705)	0	0	0	0	0	1	0	0	0	0	0
Commuter (CARs 704)	1	3	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	5	5	1	8	0	0	5	13	0	0	2
Aerial work (CARs 702)	0	0	0	2	1	3	1	2	0	3	1
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	0	0	0	0	2	0	0	0	0	0	0
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	12	11	5	8	17	4	12	21	5	8	7
Private operators (CARs 604)	0	0	0	0	3	0	0	0	0	0	0
Recreational	12	11	5	8	9	3	12	21	5	8	7
Other private	0	0	0	0	5	1	0	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	4	1	0	0	0	0	0	0	0	0	0
Persons on the ground fatally injured	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**
Persons fatally injured	**63**	**65**	**21**	**47**	**45**	**34**	**38**	**70**	**16**	**31**	**34**
Airplane	44	46	19	35	37	27	30	60	11	18	25
Helicopter	9	12	0	8	3	5	6	5	2	10	3
Ultralight	8	4	2	4	4	1	2	5	3	3	5
Other aircraft type	2	7	0	0	1	1	0	2	0	0	1

Data extracted 13 March 2023

Table 5. Persons seriously injured in air transportation accidents, by type of operation, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Persons seriously injured	**48**	**22**	**35**	**31**	**18**	**33**	**28**	**31**	**18**	**44**	**35**
In Canada, involving Canadian-registered aircraft	39	22	34	28	17	31	23	27	15	42	30
Outside Canada, involving Canadian-registered Aircraft	5	0	0	3	1	2	1	3	3	2	3
In Canada, involving foreign-registered aircraft	4	0	1	0	0	0	4	1	0	0	2
Persons seriously injured	**48**	**22**	**35**	**31**	**18**	**33**	**28**	**31**	**18**	**44**	**35**
Commercial	22	11	10	15	8	13	17	13	4	13	11
Airliner (CARs 705)	1	0	0	3	2	8	4	1	1	3	3
Commuter (CARs 704)	2	2	0	0	0	0	0	0	1	0	0
Air taxi (CARs 703)	15	6	5	8	4	0	9	8	0	1	4
Aerial work (CARs 702)	1	3	3	3	2	2	2	2	1	8	4
Foreign air operator (CARs 701)	1	0	0	0	0	0	1	0	0	0	0
Flight training units (CARs 406)	0	0	2	1	0	2	1	2	1	1	0
Other commercial	2	0	0	0	0	1	0	0	0	0	0
Private	26	10	23	16	10	20	11	18	13	31	24
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	26	10	23	14	9	19	8	18	13	31	24
Other private	0	0	0	2	1	1	3	0	0	0	0
State	0	0	0	0	0	0	0	0	1	0	0
Other/Unknown	0	1	2	0	0	0	0	0	0	0	0
Crew members seriously injured	**24**	**13**	**23**	**17**	**8**	**22**	**19**	**16**	**13**	**31**	**21**
Commercial	6	4	5	6	3	8	10	2	3	12	5
Airliner (CARs 705)	0	0	0	1	0	3	3	0	1	3	2
Commuter (CARs 704)	2	0	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	1	2	2	2	2	0	3	0	0	0	2
Aerial work (CARs 702)	1	2	1	3	1	2	2	1	1	8	1
Foreign air operator (CARs 701)	1	0	0	0	0	0	1	0	0	0	0
Flight training units (CARs 406)	0	0	2	0	0	2	1	1	1	1	0
Other commercial	1	0	0	0	0	1	0	0	0	0	0
Private	18	8	17	11	5	14	9	14	9	19	16
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	18	8	17	9	5	14	7	14	9	19	16
Other private	0	0	0	2	0	0	2	0	0	0	0
State	0	0	0	0	0	0	0	0	1	0	0
Other/Unknown	0	1	1	0	0	0	0	0	0	0	0
Passengers seriously injured	**23**	**8**	**11**	**14**	**8**	**11**	**9**	**13**	**4**	**13**	**13**
Commercial	15	6	5	9	4	5	7	9	1	1	6
Airliner (CARs 705)	0	0	0	2	2	5	1	0	0	0	1
Commuter (CARs 704)	0	2	0	0	0	0	0	0	1	0	0
Air taxi (CARs 703)	14	4	3	6	2	0	6	7	0	1	2
Aerial work (CARs 702)	0	0	2	0	0	0	0	1	0	0	3
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	0	0	0	1	0	0	0	1	0	0	0
Other commercial	1	0	0	0	0	0	0	0	0	0	0
Private	8	2	5	5	4	6	2	4	3	12	7
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	8	2	5	5	4	5	1	4	3	12	7
Other private	0	0	0	0	0	1	1	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	0	0	1	0	0	0	0	0	0	0	0
Persons on the ground seriously injured	**1**	**1**	**1**	**0**	**2**	**0**	**0**	**2**	**1**	**0**	**1**
Persons seriously injured	**48**	**22**	**35**	**31**	**18**	**33**	**28**	**31**	**18**	**44**	**35**
Airplane	31	13	21	23	10	23	23	26	10	25	25
Helicopter	7	6	6	5	6	3	2	1	3	8	6
Ultralight	6	3	7	3	1	6	3	4	4	8	3
Other aircraft type	4	0	1	0	1	1	0	0	1	3	1

Data extracted 13 March 2023

Table 6. Accidents involving Canadian-registered airplanes and helicopters, by type of operation,[1,2] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Airplane accidents	**191**	**204**	**170**	**190**	**167**	**171**	**143**	**168**	**133**	**136**	**119**
Training	27	24	27	16	20	31	14	28	23	18	22
Pleasure/Travel	109	127	96	125	112	92	83	83	74	85	65
Business	4	2	9	1	3	1	7	5	4	3	2
Forest fire management	2	3	2	2	1	0	1	2	1	4	2
Test/Demonstration/Ferry	4	4	5	2	2	4	1	3	2	3	1
Aerial application	3	7	4	5	6	6	5	6	8	1	6
Inspection	1	1	0	1	0	1	0	0	0	0	2
Air transport	28	26	22	22	16	27	26	29	15	14	14
Air ambulance	1	0	1	0	3	1	1	1	1	2	0
Sightseeing	6	1	1	1	0	1	1	2	0	1	0
Other/Unknown	8	11	4	16	5	8	6	9	5	5	5
Fatal airplane accidents	**25**	**24**	**10**	**18**	**21**	**18**	**17**	**23**	**7**	**14**	**14**
Training	1	2	1	1	1	3	0	1	1	1	2
Pleasure/Travel	16	11	7	12	15	9	12	12	5	10	7
Business	1	1	1	0	1	0	1	1	0	0	0
Forest fire management	0	0	0	1	0	0	0	0	0	1	0
Test/Demonstration/Ferry	1	1	0	0	1	0	0	1	0	0	0
Aerial application	0	1	0	0	2	1	1	0	0	0	2
Inspection	0	0	0	0	0	0	0	0	0	0	1
Air transport	4	5	1	2	1	2	2	6	1	0	1
Air ambulance	0	0	0	0	0	0	0	0	0	0	0
Sightseeing	0	0	0	1	0	0	0	0	0	0	0
Other/Unknown	3	3	0	2	0	3	2	2	0	2	1
Helicopter accidents	**41**	**27**	**34**	**32**	**27**	**27**	**26**	**27**	**16**	**29**	**20**
Training	1	1	2	5	1	7	1	2	0	1	2
Pleasure/Travel	8	2	7	8	9	4	6	9	6	6	3
Business	3	1	0	1	0	0	2	1	0	1	1
Forest fire management	1	3	0	2	0	2	2	1	1	3	1
Test/Demonstration/Ferry	0	1	0	0	0	0	1	0	0	2	1
Aerial application	5	0	1	2	1	3	1	3	2	1	4
Inspection	2	2	3	0	1	0	1	0	0	0	0
Air transport	9	8	18	9	7	3	3	9	2	6	3
Air ambulance	1	2	0	1	0	1	0	0	0	0	0
Sightseeing	1	0	1	0	0	1	1	0	0	0	0
Other/Unknown	10	7	2	4	8	6	8	2	5	9	5
Fatal helicopter accidents	**7**	**6**	**0**	**5**	**2**	**2**	**4**	**3**	**2**	**5**	**3**
Training	1	0	0	0	0	1	0	0	0	0	0
Pleasure/Travel	0	0	0	0	1	0	2	2	1	1	1
Business	1	0	0	1	0	0	0	0	0	0	0
Forest fire management	0	0	0	0	0	0	0	0	0	1	0
Test/Demonstration/Ferry	0	0	0	0	0	0	1	0	0	0	0
Aerial application	0	0	0	1	0	0	0	0	0	0	0
Inspection	0	1	0	0	0	0	0	0	0	0	0
Air transport	1	3	0	3	0	0	0	1	0	1	0
Air ambulance	0	1	0	0	0	0	0	0	0	0	0
Sightseeing	1	0	0	0	0	0	0	0	0	0	0
Other/Unknown	3	1	0	0	1	1	1	0	1	2	2

Data extracted 13 March 2023

[1] Canadian-registered aircraft, excluding ultralights, balloons, gyroplanes, gliders, airships, hang gliders and similar aircraft types.

[2] Breakdowns may not add up to totals. For example, when an occurrence involves a business airplane and a training airplane, the occurrence is counted in each type, but only once in the total.

Table 7. Fatal air transportation accidents and fatalities in Canada and outside Canada, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Accidents	**291**	**276**	**249**	**251**	**230**	**240**	**201**	**228**	**170**	**191**	**165**
Newfoundland and Labrador	5	3	5	6	5	4	4	3	2	4	4
Prince Edward Island	0	0	0	0	0	2	0	0	0	0	1
Nova Scotia	5	5	3	6	2	3	2	1	1	2	0
New Brunswick	3	2	6	2	5	7	1	8	2	2	0
Quebec	71	66	69	51	34	44	31	50	33	45	33
Ontario	67	72	67	74	50	62	53	53	39	35	48
Manitoba	18	13	12	14	17	10	7	17	9	6	9
Saskatchewan	9	19	12	13	10	13	13	12	17	8	14
Alberta	35	29	33	23	38	35	32	29	25	29	18
British Columbia	54	51	30	42	53	39	36	39	34	46	28
Yukon	8	4	4	6	2	4	4	3	0	3	2
Northwest Territories	5	3	3	2	3	2	5	4	1	2	1
Nunavut	3	4	1	2	3	3	1	1	2	3	0
Other airspace under Canadian air traffic control	0	1	0	0	0	1	1	0	0	0	0
Outside Canada	8	4	4	10	8	11	11	8	5	6	7
Fatal accidents	**42**	**38**	**14**	**29**	**29**	**22**	**23**	**33**	**12**	**22**	**24**
Newfoundland and Labrador	0	0	0	1	0	0	0	2	1	1	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	1	1	0	0	0	0	0	0	0
New Brunswick	0	0	1	0	1	0	0	1	0	0	0
Quebec	10	5	2	7	7	4	2	9	4	6	5
Ontario	10	9	5	6	5	4	6	6	1	5	10
Manitoba	3	2	0	1	1	3	0	1	0	0	1
Saskatchewan	1	2	1	2	2	2	1	0	0	0	1
Alberta	6	4	1	3	4	3	5	5	3	4	3
British Columbia	9	10	2	4	8	3	4	5	3	2	3
Yukon	1	0	0	0	0	1	0	2	0	0	0
Northwest Territories	0	1	0	0	0	0	1	1	0	0	0
Nunavut	1	0	0	0	0	0	0	0	0	2	0
Other airspace under Canadian air traffic control	0	1	0	0	0	0	0	0	0	0	0
Outside Canada	1	3	1	4	1	2	4	1	0	2	0
Persons fatally injured	**63**	**65**	**21**	**47**	**45**	**34**	**38**	**70**	**16**	**31**	**34**
Newfoundland and Labrador	0	0	0	1	0	0	0	8	1	2	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	1	1	0	0	0	0	0	0	0
New Brunswick	0	0	2	0	2	0	0	1	0	0	0
Quebec	11	5	2	16	15	6	4	14	5	7	6
Ontario	19	19	8	10	5	9	8	16	1	6	15
Manitoba	4	5	0	1	2	4	0	3	0	0	1
Saskatchewan	5	3	2	3	2	3	1	0	0	0	2
Alberta	6	5	1	4	4	5	6	8	6	7	4
British Columbia	15	17	3	7	12	4	6	12	3	3	5
Yukon	1	0	0	0	0	1	0	4	0	0	0
Northwest Territories	0	1	0	0	0	0	3	2	0	0	0
Nunavut	1	0	0	0	0	0	0	0	0	4	0
Other airspace under Canadian air traffic control	0	3	0	0	0	0	0	0	0	0	0
Outside Canada	1	6	2	4	3	2	10	2	0	2	0

Data extracted 13 March 2023

Table 8. Accidents and fatal accidents in Canada and outside Canada involving Canadian-registered aircraft,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Accidents	**239**	**243**	**212**	**227**	**200**	**208**	**173**	**200**	**153**	**170**	**145**
Newfoundland and Labrador	5	3	4	6	4	3	2	2	2	3	1
Prince Edward Island	0	0	0	0	0	1	0	0	0	0	1
Nova Scotia	3	5	2	5	2	2	1	1	1	2	0
New Brunswick	3	2	6	2	5	5	1	8	2	2	0
Quebec	52	57	57	44	28	39	28	41	29	40	30
Ontario	54	59	53	66	43	51	44	46	32	27	39
Manitoba	15	13	11	13	17	10	7	12	9	6	8
Saskatchewan	8	18	10	12	10	12	13	12	16	8	14
Alberta	30	27	31	21	36	30	27	27	23	27	16
British Columbia	46	44	27	39	43	35	30	36	32	42	27
Yukon	7	4	4	6	1	4	2	2	0	2	1
Northwest Territories	5	3	2	2	3	2	5	4	1	2	1
Nunavut	3	3	1	1	2	3	1	1	2	3	0
Other airspace under Canadian air traffic control	0	1	0	0	0	0	1	0	0	0	0
Outside Canada	8	4	4	10	6	11	11	8	4	6	7
Fatal accidents	**33**	**32**	**10**	**23**	**24**	**21**	**21**	**26**	**9**	**19**	**18**
Newfoundland and Labrador	0	0	0	1	0	0	0	1	1	1	0
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	0	0	0	0	0	0	0
New Brunswick	0	0	1	0	1	0	0	1	0	0	0
Quebec	4	3	1	6	5	4	2	5	3	5	3
Ontario	9	6	3	5	3	4	5	5	0	3	8
Manitoba	3	2	0	0	1	3	0	1	0	0	1
Saskatchewan	1	2	1	2	2	2	1	0	0	0	1
Alberta	5	4	1	3	4	3	4	5	2	4	2
British Columbia	8	9	2	2	7	2	4	5	3	2	3
Yukon	1	0	0	0	0	1	0	1	0	0	0
Northwest Territories	0	1	0	0	0	0	1	1	0	0	0
Nunavut	1	0	0	0	0	0	0	0	0	2	0
Other airspace under Canadian air traffic control	0	1	0	0	0	0	0	0	0	0	0
Outside Canada	1	3	1	4	1	2	4	1	0	2	0
Persons fatally injured	**54**	**59**	**15**	**40**	**34**	**33**	**36**	**54**	**13**	**28**	**27**
Newfoundland and Labrador	0	0	0	1	0	0	0	7	1	2	0
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	0	0	0	0	0	0	0	0	0
New Brunswick	0	0	2	0	2	0	0	1	0	0	0
Quebec	5	3	1	15	7	6	4	8	4	6	4
Ontario	18	16	4	9	3	9	7	9	0	4	13
Manitoba	4	5	0	0	2	4	0	3	0	0	1
Saskatchewan	5	3	2	3	2	3	1	0	0	0	2
Alberta	5	5	1	4	4	5	5	8	5	7	2
British Columbia	14	16	3	4	11	3	6	12	3	3	5
Yukon	1	0	0	0	0	1	0	2	0	0	0
Northwest Territories	0	1	0	0	0	0	3	2	0	0	0
Nunavut	1	0	0	0	0	0	0	0	0	4	0
Other airspace under Canadian air traffic control	0	3	0	0	0	0	0	0	0	0	0
Outside Canada	1	6	2	4	3	2	10	2	0	2	0

Data extracted 13 March 2023

[1] Canadian-registered aircraft, excluding ultralights, balloons, gyroplanes, gliders, airships, hang gliders and similar aircraft types.

Table 9. Reportable aircraft incidents, by type of operation,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Incidents[1]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Risk of collision / Loss of separation	102	115	94	111	139	172	141	138	49	62	124
Declared emergency	266	294	313	333	311	348	340	366	190	205	310
Engine failure	92	83	104	110	110	98	91	103	50	83	65
Smoke/Fire	71	67	89	87	85	100	99	91	25	44	53
Collision	5	15	16	8	18	24	26	31	8	7	17
Control difficulties	33	25	40	29	35	34	41	25	25	24	39
Crew unable to perform duties	40	58	37	46	66	78	57	87	34	16	47
Dangerous goods-related	1	3	4	0	2	0	2	0	0	3	0
Depressurization	15	14	12	16	14	21	13	23	5	16	14
Fuel shortage	7	2	6	17	15	17	10	5	3	3	5
Failure to remain in landing area	10	9	20	17	19	22	11	9	10	10	17
Incorrect fuel	0	0	0	0	1	3	0	3	4	3	1
Slung load released	1	4	5	14	15	21	23	28	11	17	22
Transmission or gearbox failure	2	0	1	1	3	1	0	1	0	0	0
Incidents[1,2]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Commercial	609	656	699	741	785	888	815	869	393	461	671
Airliner (CARs 705)	409	450	429	437	490	614	547	572	220	246	415
Commuter (CARs 704)	83	95	106	87	79	73	60	67	50	51	56
Air taxi (CARs 703)	22	30	79	114	104	102	90	104	59	83	93
Aerial work (CARs 702)	11	12	34	48	43	55	55	59	35	56	56
Foreign air operator (CARs 701)	117	113	82	75	94	80	91	86	32	27	55
Flight training units (CARs 406)	3	4	5	6	12	11	7	13	7	8	7
Other commercial	1	1	0	2	5	1	2	4	2	2	5
Private	35	31	37	52	45	56	51	56	27	38	51
Private operators (CARs 604)	20	18	22	19	19	32	19	25	12	18	27
Recreational	15	13	14	15	14	11	9	10	6	15	14
Other private	0	0	1	18	12	13	23	22	10	6	10
State	20	20	13	15	8	15	11	8	5	7	9
Other/Unknown	4	4	12	15	22	13	12	12	2	3	5
Incidents[1,2]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Airplane	633	673	715	749	795	892	819	842	400	458	684
Helicopter	17	20	30	47	38	52	43	77	21	41	41
Ultralight/Other aircraft type[3]	0	0	3	8	7	4	4	6	0	1	1
Aircraft involved in incidents[1,4]	**742**	**800**	**830**	**887**	**957**	**1063**	**970**	**1016**	**452**	**533**	**772**
Airplanes	725	780	797	832	912	1006	921	931	431	491	730
Helicopters	17	20	30	47	38	53	45	79	21	41	41
Ultralight / Other aircraft type[3]	0	0	3	8	7	4	4	6	0	1	1
Incidents[1]	**645**	**689**	**741**	**789**	**833**	**939**	**860**	**915**	**421**	**500**	**724**
Newfoundland and Labrador	17	29	22	30	31	27	35	29	11	16	21
Prince Edward Island	0	2	0	1	4	1	2	1	1	1	3
Nova Scotia	17	11	22	19	17	22	28	28	13	6	11
New Brunswick	7	7	8	9	9	4	7	11	3	6	6
Quebec	107	122	89	116	109	139	141	147	75	76	108
Ontario	155	166	157	152	166	230	144	166	89	115	133
Manitoba	31	31	51	54	47	49	43	44	26	42	34
Saskatchewan	18	27	32	21	25	19	16	24	15	19	20
Alberta	81	103	98	117	110	107	104	106	43	40	62
British Columbia	101	99	132	154	137	101	123	129	56	75	88
Yukon	4	5	6	6	5	5	2	8	1	6	2
Northwest Territories	17	16	25	17	9	20	22	9	11	12	16
Nunavut	19	10	20	15	15	15	19	15	4	11	21
Other airspace under Canadian air traffic control	23	23	24	20	32	19	14	17	7	3	25
Outside Canada	48	38	55	58	117	181	161	181	66	72	173

Data extracted 13 March 2023

[1] Under the 2014 TSB Regulations, reportable aviation incidents include a) aircraft having a maximum certificated take-off weight greater than 2250 kg (formerly 5700 kg); b) aircraft being operated under an air operator certificate issued under the *Canadian Aviation Regulations*, Part VII.

[2] Breakdowns may not add up to totals. For example, when an occurrence involves an airplane and a helicopter, the occurrence is counted in each type, but only once in the total.

[3] Includes balloons, gyroplanes, gliders, airships, hang gliders, remotely piloted aircraft systems (RPAS), and similar aircraft types.

[4] "Aircraft involved in accidents" are aircraft counts; all other data are accident counts.

Table 10. Reportable incidents[1] in Canada and outside Canada involving Canadian-registered aircraft, 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Incidents[1]	**530**	**579**	**654**	**711**	**737**	**866**	**769**	**835**	**385**	**473**	**663**
Risk of collision / Loss of separation	92	105	84	101	127	159	134	128	48	61	122
Declared emergency	200	231	277	290	263	316	298	318	170	192	267
Engine failure	77	70	94	102	102	88	79	96	44	78	62
Smoke/Fire	59	55	76	79	75	95	85	83	21	41	48
Collision	4	14	15	7	16	23	21	27	8	7	17
Control difficulties	31	22	36	28	30	33	40	25	24	24	37
Crew unable to perform duties	38	56	35	44	65	74	55	86	30	15	46
Dangerous goods-related	1	3	3	0	2	0	2	0	0	2	0
Depressurization	13	10	10	14	13	19	11	23	5	15	11
Fuel shortage	4	2	3	15	11	16	5	4	3	3	5
Failure to remain in landing area	9	7	17	17	14	18	10	8	10	10	16
Incorrect fuel	0	0	0	0	1	3	0	3	4	3	1
Slung load released	1	4	4	13	15	21	23	28	11	17	22
Transmission or gearbox failure	1	0	0	1	3	1	0	1	0	0	0
Incidents by operator type[1,2]	**530**	**579**	**654**	**711**	**737**	**866**	**769**	**835**	**385**	**473**	**663**
Commercial	504	552	622	674	705	825	741	799	363	437	620
Airliner (CARs 705)	409	449	427	436	489	613	546	571	218	246	414
Commuter (CARs 704)	83	95	106	87	79	73	60	67	50	51	56
Air taxi (CARs 703)	21	30	79	114	104	102	90	104	58	83	93
Aerial work (CARs 702)	11	12	31	47	43	55	55	59	35	56	56
Flight training units (CARs 406)	3	4	5	6	12	11	7	13	7	8	7
Other commercial	0	0	0	1	2	0	1	3	1	2	5
Private	28	25	29	40	37	48	33	45	22	35	45
Private operators (CARs 604)	14	13	17	16	19	32	19	24	12	18	27
Recreational	14	12	11	14	12	11	8	10	6	14	14
Other private	0	0	1	10	6	5	6	12	5	4	4
State	17	19	11	15	6	13	10	8	5	7	8
Other/Unknown	2	4	9	14	14	10	12	10	1	3	1
Incidents[1,2]	**530**	**579**	**654**	**711**	**737**	**866**	**769**	**835**	**385**	**473**	**663**
Airplane	519	563	631	672	699	819	728	762	364	432	623
Helicopter	16	20	27	46	38	52	43	77	21	41	41
Ultralight / Other aircraft type[3]	0	0	3	8	6	4	4	6	0	0	1
Aircraft involved in incidents[1,4]	**619**	**681**	**730**	**800**	**843**	**981**	**874**	**927**	**415**	**505**	**709**
Airplanes	603	661	700	746	799	924	825	842	394	464	667
Helicopters	16	20	27	46	38	53	45	79	21	41	41
Ultralight / Other aircraft type[3]	0	0	3	8	6	4	4	6	0	0	1
Incidents by province/territory[1]	**530**	**579**	**654**	**711**	**737**	**866**	**769**	**835**	**385**	**473**	**663**
Newfoundland and Labrador	10	17	13	20	22	22	22	15	8	14	19
Prince Edward Island	0	1	0	1	4	1	2	1	1	1	3
Nova Scotia	9	9	19	17	12	17	20	26	11	5	8
New Brunswick	7	4	6	9	9	3	6	8	2	6	6
Quebec	84	96	81	103	99	127	122	125	68	73	103
Ontario	127	142	139	141	148	202	129	146	85	109	117
Manitoba	30	27	45	51	44	47	38	44	25	40	32
Saskatchewan	14	26	27	19	25	18	14	24	13	19	19
Alberta	75	93	93	110	103	102	97	100	38	35	55
British Columbia	87	93	125	137	118	100	114	124	52	71	83
Yukon	3	3	5	6	5	3	2	8	1	5	1
Northwest Territories	17	16	25	17	8	20	21	8	10	12	16
Nunavut	15	10	16	14	15	14	16	14	3	10	19
Other airspace under Canadian air traffic control	4	4	5	8	8	9	5	11	2	1	9
Outside Canada	48	38	55	58	117	181	161	181	66	72	173

Data extracted 13 March 2023

[1] Under the 2014 TSB Regulations, reportable aviation incidents include a) aircraft having a maximum certificated take-off weight greater than 2250 kg (formerly 5700 kg); b) aircraft being operated under an air operator certificate issued under the *Canadian Aviation Regulations*, Part VII.

[2] Breakdowns may not add up to totals. For example, when an occurrence involves an airplane and a helicopter, the occurrence is counted in each type, but only once in the total.

[3] Includes balloons, gyroplanes, gliders, airships, hang gliders, remotely piloted aircraft systems (RPAS), and similar aircraft types.

[4] "Aircraft involved in accidents" are aircraft counts; all other data are accident counts.

Table 11. Airplane accidents by phase of flight and selected event category,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Standing/Taxiing	**17**	**23**	**16**	**19**	**16**	**20**	**13**	**14**	**4**	**6**	**11**	**159**
Collision with object	7	8	6	3	5	9	6	5	1	5	6	61
Collision with moving aircraft	2	1	3	5	4	3	3	2	1	3	0	27
Nosedown/Overturned	3	5	1	3	2	2	0	1	0	0	6	23
Landing gear collapse/retracted	0	2	1	2	1	3	1	2	0	0	0	12
Loss of control	3	4	1	0	0	0	0	0	0	0	0	8
Other events	9	11	9	12	13	14	10	10	3	4	7	102
Takeoff	**54**	**40**	**48**	**53**	**47**	**45**	**35**	**48**	**30**	**40**	**23**	**463**
Collision with terrain	21	11	10	18	13	15	7	14	4	12	4	129
Loss of control	17	7	18	9	11	7	5	11	3	11	1	100
Collision with object	17	8	11	18	12	8	11	17	12	10	7	131
Takeoff/landing event	19	9	11	11	14	16	11	11	8	13	7	130
Power loss	6	13	16	12	10	11	5	12	6	2	3	96
Other events	33	26	34	50	30	35	31	38	28	36	21	362
En route	**30**	**34**	**23**	**29**	**19**	**34**	**27**	**28**	**24**	**20**	**20**	**288**
Power loss	15	15	14	8	12	15	11	12	8	5	8	123
Precautionary/forced landing / Ditching	9	8	7	5	4	5	6	8	4	6	3	65
Collision with terrain	7	10	5	4	5	5	5	6	3	3	5	58
Component/system related	2	3	2	3	0	3	1	2	3	1	1	21
Other events	14	18	14	26	8	24	22	21	19	15	14	195
Manoeuvring	**11**	**12**	**4**	**11**	**13**	**11**	**12**	**15**	**14**	**4**	**12**	**119**
Collision with terrain	8	7	1	7	6	7	4	5	6	1	8	60
Loss of control	4	1	1	2	4	5	4	0	3	1	3	28
Collision with object	1	2	1	2	3	1	2	5	3	0	4	24
Power loss	1	0	0	1	2	1	1	1	2	1	3	13
Other events	2	5	3	4	6	2	8	12	7	3	9	61
Approach	**21**	**32**	**28**	**25**	**17**	**21**	**25**	**27**	**24**	**20**	**26**	**266**
Collision with terrain	6	6	7	10	4	7	5	8	1	3	13	70
Power loss	0	11	6	2	3	6	6	5	6	3	6	54
Collision with object	1	7	9	7	6	7	3	2	5	0	7	54
Component/system related	3	3	4	2	0	2	3	3	2	1	0	23
Precautionary/forced landing / Ditching	2	7	7	1	1	4	5	7	4	2	2	42
Loss of control	4	5	1	4	1	0	1	5	0	2	6	29
Other events	14	10	9	18	12	13	18	21	18	16	13	162
Landing	**111**	**116**	**99**	**118**	**113**	**95**	**92**	**93**	**80**	**83**	**57**	**1057**
Missed or went off runway	26	28	14	30	30	21	17	23	20	18	16	243
Collision with object	26	18	20	29	24	23	29	25	18	19	14	245
Landing gear collapsed/retracted	22	25	17	27	27	23	19	17	18	18	7	220
Nosedown/Overturned	20	20	17	27	33	29	23	21	19	25	14	248
Loss of control	27	19	22	2	3	6	3	4	0	3	4	93
Hard landing	20	13	14	10	17	19	16	17	7	11	4	148
Collision with terrain	18	12	21	20	12	7	11	10	8	4	6	129
Wheels-up landing	7	10	7	10	9	4	5	7	1	3	2	65
Precautionary/forced landing / Ditching	9	11	5	12	18	18	7	7	9	7	7	110
Other events	42	45	28	77	77	50	58	53	53	50	31	564
Post-impact	**19**	**13**	**16**	**37**	**57**	**41**	**44**	**31**	**9**	**6**	**9**	**282**
Fire/Explosion/Fumes	7	7	6	13	9	5	7	5	4	0	2	65
Other events	12	6	12	24	49	37	38	26	5	6	7	222

Data extracted 13 March 2023

[1] Breakdowns do not add up to totals. For example, in the take-off phase, if an occurrence involves both "Loss of control" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

Table 12. Helicopter accidents, by selected event category and phase of flight,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Standing/Taxiing	**4**	**1**	**4**	**2**	**0**	**1**	**4**	**3**	**0**	**2**	**1**	**22**
Collision with terrain	1	0	0	1	0	0	0	0	0	0	1	3
Loss of control	0	0	2	1	0	0	0	2	0	1	0	6
Collision with object	0	0	2	1	0	1	1	1	0	0	0	6
Other events	4	1	4	0	0	0	4	2	0	2	1	18
Takeoff	**7**	**7**	**9**	**4**	**6**	**5**	**5**	**6**	**1**	**8**	**5**	**63**
Loss of control	2	0	5	1	4	4	1	3	0	4	1	25
Collision with terrain	1	2	1	2	1	1	2	2	0	1	1	14
Collision with object	4	2	2	1	0	1	2	3	0	2	1	18
Power loss	0	1	1	0	1	0	0	0	0	1	1	5
Other events	2	2	4	1	3	2	2	4	1	6	2	29
En route	**9**	**5**	**7**	**4**	**5**	**3**	**6**	**4**	**5**	**7**	**2**	**57**
Collision with terrain	3	1	3	1	1	1	2	2	1	2	0	17
Power loss	3	1	1	1	3	0	1	1	1	2	0	14
Precautionary/forced landing / Ditching	1	1	0	1	0	0	0	0	0	1	0	4
Component/system related	0	1	0	1	0	0	0	1	0	2	0	5
Other events	6	4	5	3	4	3	5	1	5	6	2	44
Manoeuvring	**11**	**8**	**4**	**8**	**8**	**7**	**4**	**9**	**5**	**10**	**8**	**82**
Collision with terrain	5	5	2	3	5	3	2	2	2	3	4	36
Loss of control	3	2	2	2	3	4	0	2	2	4	2	26
Collision with object	3	2	1	1	3	3	1	4	1	2	1	22
Operations related event	2	1	0	2	5	3	1	6	1	1	0	22
Power loss	2	1	0	2	1	1	0	1	0	0	0	8
Other events	6	2	2	5	5	5	2	7	4	4	5	47
Approach	**7**	**3**	**3**	**3**	**5**	**2**	**2**	**2**	**1**	**3**	**2**	**33**
Collision with terrain	1	0	0	0	1	0	0	0	0	2	0	4
Power loss	2	0	1	1	3	0	0	0	0	1	0	8
Loss of control	1	0	1	1	2	1	1	0	0	0	0	7
Collision with object	0	0	1	0	1	1	0	0	0	0	0	3
Other events	5	3	2	2	4	1	1	2	1	2	2	25
Landing	**13**	**12**	**12**	**18**	**16**	**13**	**12**	**12**	**9**	**13**	**12**	**142**
Hard landing	4	1	3	1	0	1	2	0	0	0	2	14
Collision with terrain	4	0	3	6	0	0	2	1	1	0	3	20
Loss of control	1	2	4	6	2	1	2	3	6	2	4	33
Collision with object	2	5	5	1	4	3	6	2	5	2	0	35
Other events	4	9	5	10	4	5	5	7	5	3	4	61
Post-impact	**2**	**3**	**2**	**5**	**11**	**1**	**6**	**5**	**2**	**5**	**3**	**45**
Fire/Explosion/Fumes	1	2	0	1	0	0	0	3	2	2	0	11
Other events	1	1	2	4	11	1	6	4	0	4	3	37

Data extracted 13 March 2023

[1] Breakdowns do not add up to totals. For example, in the take-off phase, if an occurrence involves both "Loss of control" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

Table 13. Fatal airplane accidents, by phase of flight and selected event category,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Standing/Taxiing	**1**	**1**	**0**	**1**	**2**	**1**	**0**	**1**	**1**	**0**	**0**	**8**
Collision with object	0	0	0	0	0	0	0	0	0	0	0	0
Collision with moving aircraft	0	0	0	0	0	0	0	0	0	0	0	0
Nosedown/Overturned	0	0	0	0	0	0	0	0	0	0	0	0
Landing gear collapsed/retracted	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	0	0	0	0	0	0	0	0	0	0	0	0
Other events	1	1	0	1	2	1	0	1	1	0	0	8
Takeoff	**6**	**4**	**2**	**9**	**5**	**6**	**5**	**7**	**1**	**7**	**2**	**54**
Collision with terrain	4	3	0	4	4	5	2	5	0	6	1	34
Loss of control	2	2	1	4	4	2	2	2	0	3	0	22
Collision with object	2	0	0	1	0	1	1	1	0	0	1	7
Takeoff/landing event	1	1	1	0	0	1	0	0	1	1	0	6
Power loss	0	0	1	1	1	1	0	1	0	0	0	5
Other events	3	2	0	7	1	4	4	3	1	5	2	32
En route	**8**	**9**	**3**	**7**	**5**	**5**	**6**	**10**	**2**	**4**	**4**	**63**
Power loss	1	0	0	0	2	0	1	2	0	0	0	6
Precautionary/forced landing / Ditching	0	0	0	0	1	0	0	1	0	1	0	3
Collision with terrain	6	7	3	4	4	3	5	6	1	3	2	44
Component/system related	0	0	0	1	0	0	0	0	0	0	0	1
Other events	2	5	1	6	2	4	5	7	1	3	3	39
Manoeuvring	**4**	**3**	**2**	**4**	**5**	**4**	**5**	**4**	**4**	**0**	**4**	**39**
Collision with terrain	4	2	1	4	4	4	3	4	3	0	4	33
Loss of control	2	0	1	0	2	2	4	0	1	0	2	14
Collision with object	0	0	0	1	1	1	0	0	1	0	1	5
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Other events	0	1	1	0	1	1	3	2	1	0	3	13
Approach	**5**	**5**	**1**	**5**	**4**	**4**	**4**	**4**	**0**	**1**	**6**	**39**
Collision with terrain	3	5	0	3	3	3	2	2	0	1	4	26
Power loss	0	1	0	0	0	0	0	0	0	0	0	1
Collision with object	0	0	0	1	1	1	0	0	0	0	3	6
Component/system related	0	0	0	0	0	1	0	2	0	0	0	3
Precautionary/forced landing / Ditching	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	1	2	0	0	1	0	0	1	0	0	3	8
Other events	4	1	1	2	2	2	2	3	0	0	1	18
Landing	**3**	**3**	**4**	**4**	**5**	**0**	**1**	**4**	**0**	**3**	**0**	**27**
Missed or went off runway	0	0	1	0	1	0	0	0	0	0	0	2
Collision with object	0	0	0	1	1	0	1	2	0	2	0	7
Landing gear collapsed/retracted	0	0	0	0	0	0	0	0	0	0	0	0
Nosedown/Overturned	1	2	1	0	0	0	1	2	0	0	0	7
Loss of control	0	1	0	0	0	0	0	0	0	0	0	1
Hard landing	1	0	0	0	0	0	0	0	0	0	0	1
Collision with terrain	3	2	2	2	4	0	0	1	0	0	0	14
Wheels-up landing	0	0	0	0	0	0	0	0	0	0	0	0
Precautionary/forced landing / Ditching	0	1	0	1	0	0	0	0	0	0	0	2
Other events	2	0	2	1	3	0	1	2	0	2	0	13
Post-impact	**8**	**8**	**4**	**10**	**9**	**5**	**8**	**4**	**1**	**0**	**3**	**60**
Fire/Explosion/Fumes	6	7	3	10	7	4	6	3	1	0	2	49
Other events	2	1	2	0	2	1	2	1	0	0	1	12

Data extracted 13 March 2023

[1] Breakdowns do not add up to totals. For example, in the takeoff phase, if an occurrence involves both "Loss of control" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

Table 14. Fatal helicopter accidents, by phase of flight and selected event category,[1] 2012 to 2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Standing/Taxiing	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Collision with terrain	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	0	0	0	0	0	0	0	0	0	0	0	0
Collision with object	0	0	0	0	0	0	0	0	0	0	0	0
Other events	0	0	0	0	0	0	0	0	0	0	0	0
Takeoff	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**5**
Loss of control	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	0	1	0	1	0	0	0	0	0	0	0	2
Collision with object	0	1	0	1	0	0	0	0	0	0	0	2
Power loss	0	0	0	0	0	0	0	0	0	0	1	1
Other events	0	0	0	0	0	0	0	0	1	0	1	2
En route	**3**	**2**	**0**	**2**	**1**	**1**	**4**	**3**	**0**	**2**	**1**	**19**
Collision with terrain	2	1	0	1	1	0	2	2	0	1	0	10
Power loss	0	0	0	0	0	0	0	1	0	0	0	1
Precautionary/forced landing / Ditching	0	0	0	0	0	0	0	0	0	0	0	0
Component/system related	0	0	0	0	0	0	0	1	0	0	0	1
Other events	2	2	0	1	1	1	3	0	0	2	1	13
Manoeuvring	**3**	**2**	**0**	**1**	**1**	**1**	**1**	**1**	**2**	**3**	**2**	**17**
Collision with terrain	1	2	0	1	0	1	1	0	1	2	1	10
Loss of control	1	1	0	0	0	1	0	0	1	1	0	5
Collision with object	0	0	0	0	1	1	0	0	0	0	0	2
Operations related event	2	0	0	0	0	1	0	1	1	0	0	5
Power loss	1	0	0	1	0	0	0	0	0	0	0	2
Other events	2	0	0	0	1	1	0	1	1	1	1	8
Approach	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**4**
Collision with terrain	0	0	0	0	0	0	0	0	0	1	0	1
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	1	0	0	0	0	0	0	0	0	0	0	1
Collision with object	0	0	0	0	0	0	0	0	0	0	0	0
Other events	1	0	0	0	0	0	0	1	0	1	1	4
Landing	**2**	**0**	**0**	**2**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**7**
Hard landing	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	2	0	0	1	0	0	0	0	0	0	0	3
Loss of control	0	0	0	1	0	0	0	0	0	0	0	1
Collision with object	0	0	0	0	1	0	2	0	0	0	0	3
Other events	0	0	0	0	0	0	0	1	0	0	0	1
Post-impact	**1**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**7**
Fire/Explosion/Fumes	1	1	0	1	0	0	0	0	1	1	0	5
Other events	0	1	0	0	0	0	0	0	0	0	1	2

Data extracted 13 March 2023

[1] Breakdowns do not add up to totals. For example, in the take-off phase, if an occurrence involves both "Loss of control" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

Definitions

The following definitions apply to air transportation occurrences that are required to be reported pursuant to the *Canadian Transportation Accident Investigation and Safety Board Act* and the *Transportation Safety Board Regulations*.

Aviation occurrence

- Any accident or incident associated with the operation of an aircraft, and
- any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described below.

Reportable aviation accident

An aviation accident is an occurrence resulting directly from the operation of an aircraft in which

a. a person is killed or sustains a serious injury as a result of

   i. being on board the aircraft,

   ii. coming into direct contact with any part of the aircraft, including parts that have become detached from the aircraft, or

   iii. being directly exposed to jet blast, rotor down wash or propeller wash;

b. the aircraft sustains structural failure or damage that adversely affects the aircraft's structural strength, performance or flight characteristics and would normally require major repair or replacement of any affected component, except for

   i. engine failure or damage, when the damage is limited to the engine, its cowlings or accessories, or

   ii. damage limited to propellers, wing tips, antennae, tires, brakes, fairings or small dents or puncture holes in the aircraft's skin; or

c. the aircraft is missing or inaccessible.

Reportable aviation incident

An aviation incident is an occurrence resulting directly from the operation of an aircraft having a maximum certificated take-off weight greater than 2250 kg or of an aircraft being operated under an air operator certificate issued under Part VII of the *Canadian Aviation Regulations* in which,

a. an engine fails or is shut down as a precautionary measure;

b. a power train transmission gearbox malfunction occurs;

c. smoke is detected or a fire occurs on board;

d. difficulties in controlling the aircraft are encountered owing to any aircraft system malfunction, weather phenomena, wake turbulence, uncontrolled vibrations or operations outside the flight envelope;

e. the aircraft fails to remain within the intended landing or take-off area, lands with all or part of the landing gear retracted or drags a wing tip, an engine pod or any other part of the aircraft;

f. a crew member whose duties are directly related to the safe operation of the aircraft is unable to perform their duties as a result of a physical incapacitation which poses a threat to the safety of persons, property or the environment;

g. depressurization of the aircraft occurs that requires an emergency descent;

h. a fuel shortage occurs that requires a diversion or requires approach and landing priority at the destination of the aircraft;

i. the aircraft is refuelled with the incorrect type of fuel or contaminated fuel;

j. a minor collision, a risk of collision or a loss of separation occurs;

k. a crew member declares an emergency or indicates an emergency that requires priority handling by air traffic services or the standing by of emergency response services;

l. a slung load is released unintentionally or as a precautionary or emergency measure from the aircraft; or

m. any dangerous goods are released in or from the aircraft.

Collision

Collision means an impact, other than an impact associated with normal operating circumstances, between aircraft or between an aircraft and another object or terrain.

Risk of collision

Risk of collision means a situation in which an aircraft comes so close to being involved in a collision that a threat to the safety of any person, property or the environment exists.

Loss of separation

Loss of separation means a situation in which the distance separating two aircraft is less than the minimum established in the *Canadian Domestic Air Traffic Control Separation Standards*, published by the Department of Transport, as amended from time to time.

Serious injury

- a fracture of any bone, except simple fractures of fingers, toes or the nose;
- lacerations that cause severe hemorrhage or nerve, muscle or tendon damage,
- an injury to an internal organ;
- second or third degree burns, or any burns affecting more than 5% of the body surface;
- a verified exposure to infectious substances or injurious radiation; or

- an injury that is likely to require hospitalization.

Operation

Operation means the activities for which an aircraft is used from the time any person boards the aircraft with the intention of flight until they disembark.

Operator

Operator has the same meaning as in subsection 101.01(1) of the *Canadian Aviation Regulations*.

Commercial operators

Commercial operators include carriers that offer a "for-hire" service to transport people or goods, or to undertake specific tasks such as aerial photography, flight training, or crop spraying.

Airliner

An airplane used by a Canadian air operator in an air transport service or in aerial work involving sightseeing operations, that has a MCTOW of more than 8 618 kg (19 000 pounds) or for which a Canadian type certificate has been issued authorizing the transport of 20 or more passengers.

Commuter aircraft

An airplane used by a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, in which the aircraft is

- a multi-engined aircraft that has a MCTOW of 8618 kg (19 000 pounds) or less and a seating configuration, excluding pilot seats, of 10 to 19, inclusive; or
- a turbo jet powered airplane that has a maximum zero fuel weight of 22 680 kg (50 000 pounds) or less and for which a Canadian type certificate has been issued authorizing the transport of not more than 19 passengers.

Aerial work aircraft

A commercially operated airplane or helicopter used in aerial work involving

- the carriage on board of persons other than flight crew members;
- the carriage of helicopter external loads;
- the towing of objects; or
- the dispersal of products.

Air taxi aircraft

A commercially operated aircraft used in an air transport service or in aerial work involving sightseeing operations, in which the aircraft is

- a single engined aircraft;

- a multi engined aircraft, other than a turbo jet powered airplane, that has a MCTOW of 8618 kg (19 000 pounds) or less and a seating configuration, excluding pilot seats, of nine or less; or
- any aircraft that is authorized by the Minister of Transport to be operated under Part VII, Subpart 3, Division 1 of the CARs.

State operators

State operators include the federal and provincial governments.

Private operators

Private operator means the holder of a private operator registration document issued under subsection 604.04(2) of the CARs.

Recreational operators

Recreational operators cannot operate under Part VII of the CARs, or transport people or cargo on a "for-hire" basis.