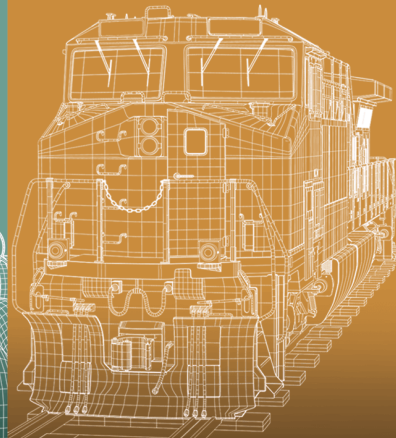
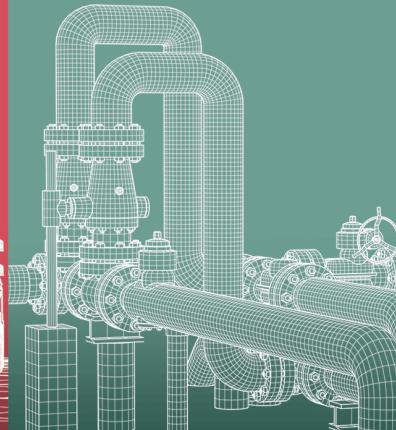




Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



STATISTICAL SUMMARY

Air Transportation Occurrences in 2021

Canada 

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Le présent rapport est également disponible en français.

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Statistical Summary

Air Transportation Occurrences in 2021

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

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 airplane¹ 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 2021 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 15 March 2022. 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.

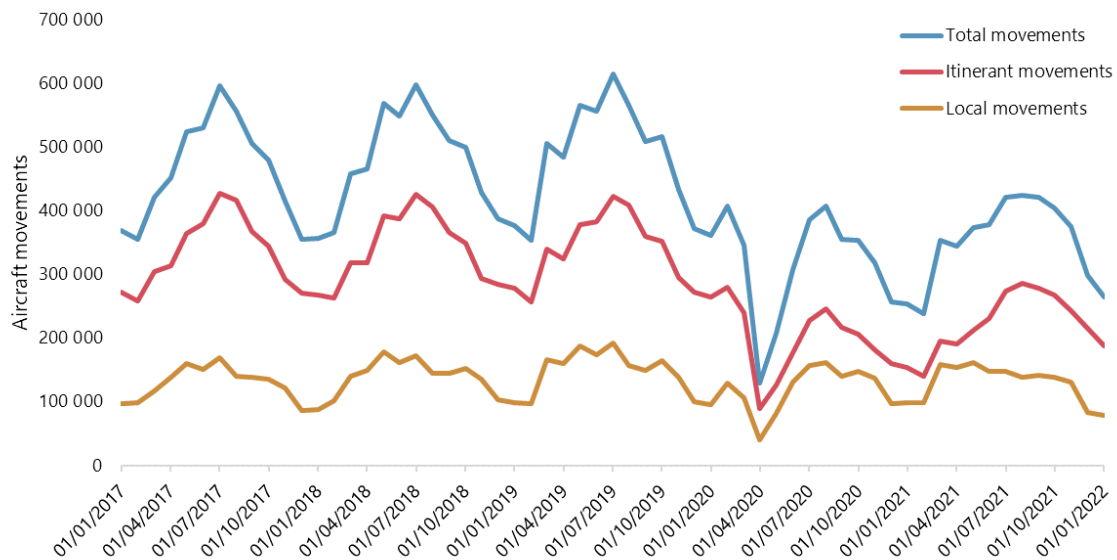
¹ The term “airplane” is synonymous with Transport Canada’s term “aeroplane” and will be used throughout the document for simplicity.

COVID-19 impacts on civil aviation in Canada

Air transportation in Canada continued to be affected by COVID-19 during the whole of 2021. As the year progressed, vaccination rates increased and travel restrictions were eased in Canada and abroad, and commercial air travel resumed—in particular during the second half of the year. Information collected by Statistics Canada indicates that total aircraft movements (take-offs and landings) at the 90 airports with NAV CANADA towers and flight service stations numbered just under 300 000 in December 2021, up almost 17% from December 2020. Itinerant movements (from one airport to another) rose almost 35% to 215 000, while local movements (within the vicinity of the airport) declined nearly 14% to 83 000. Compared with December 2019, before the pandemic, total movements were down 19.7% in December 2021. Itinerant movements fell 21.0%, while local movements declined 16.3% (Figure 1). Unfortunately, data for small airports (without NAV CANADA towers or flight service stations) are not available.

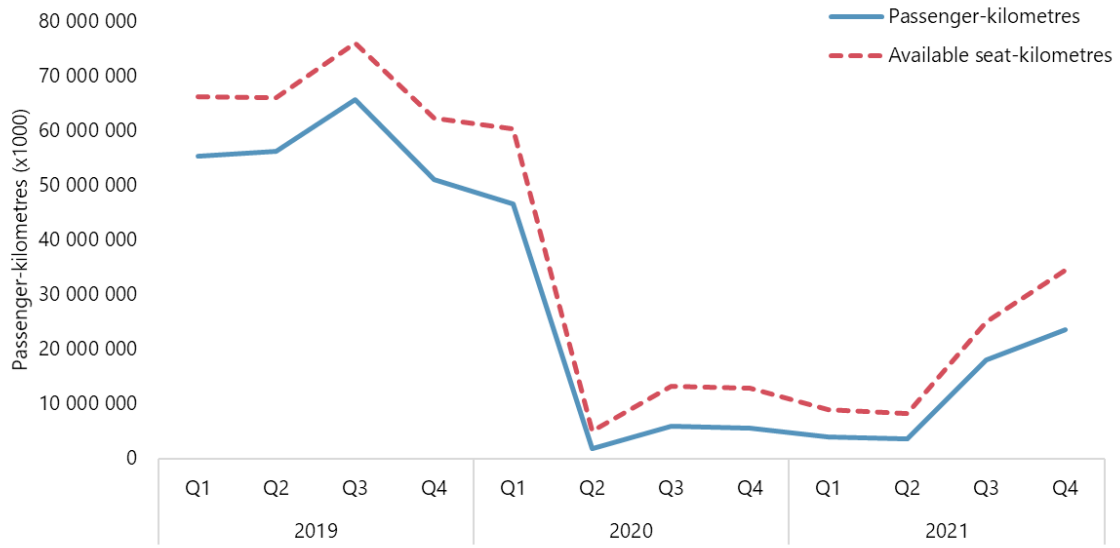
Overall, aircraft movements at the 90 airports serviced by NAV CANADA reached 4.29 million in 2021, up 11.8% from 3.84 million in 2020. Compared with 2019 (before the pandemic), total aircraft movements in 2021 were down 26.8%. This figure is indicative of a partial recovery of activity in the commercial sectors responsible for air travel, air cargo, aerial work, and flight training. The numbers presented above also include recreational aviation activity at major airports. However, it is difficult to estimate the amount of activity – commercial or private – at small airports in Canada, or off-airport entirely, and therefore a full picture of aviation industry activity is lacking. Nonetheless, these activity patterns are informative, and give partial context to the accident statistics discussed in this document.

Figure 1. Total aircraft movements at major airports, by class of operation (Source: Statistics Canada)²



² Statistics Canada. Table 23-10-0002-01 Aircraft movements, by class of operation and peak hour and peak day of movements, for airports with NAV CANADA towers, monthly. DOI: doi.org/10.25318/2310000201-eng, and Table 23-10-0009-01 Aircraft movements, by class of operation and peak hour and peak day of movements, airports with NAV CANADA flight service stations, monthly. DOI: doi.org/10.25318/2310000901-eng (last accessed on 14 April 2022).

Figure 2. Passengers carried, major Canadian air carriers (Source: Statistics Canada)³



³ 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 14 April 2022).

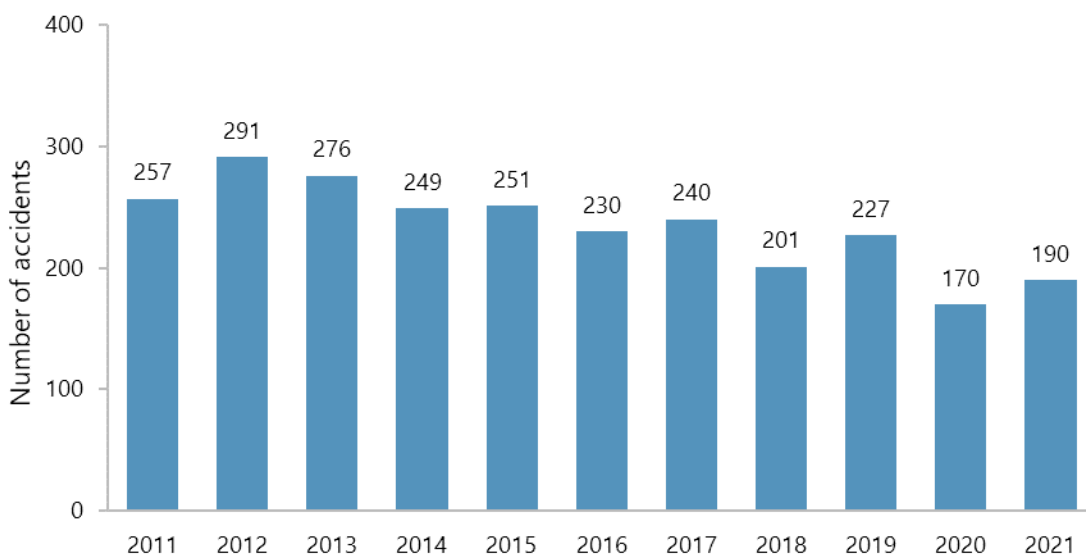
Overview of accidents and fatalities

Accident counts

Air transportation occurrences 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.⁴

In 2021, a total of 190 air transportation accidents were reported to the TSB (Table 1 and Figure 3). This number is 12% higher than the previous year's total of 170 accidents but 21% below the yearly average of 239 accidents reported in the prior 10 years, 2011 to 2020. Most (183) of the accidents in 2021 took place in Canada and involved Canadian-registered aircraft. Six accidents involving Canadian-registered aircraft took place outside Canada, and one accident 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, 2011 to 2021



There were 169 accidents involving Canadian-registered aircraft (excluding ultralights) in 2021 (Table 2). This is above the 2020 count of 153 accidents, and 19% below the average of 209 accidents in the preceding 10 years (2011 to 2020). If the 20 accidents involving ultralights are included in the count, there were 189 accidents involving Canadian-registered aircraft in 2021.

⁴ *Transportation Safety Board Regulations*, at laws-lois.justice.gc.ca/eng/regulations/SOR-2014-37/index.html (last accessed on 19 April 2022).

Aircraft type

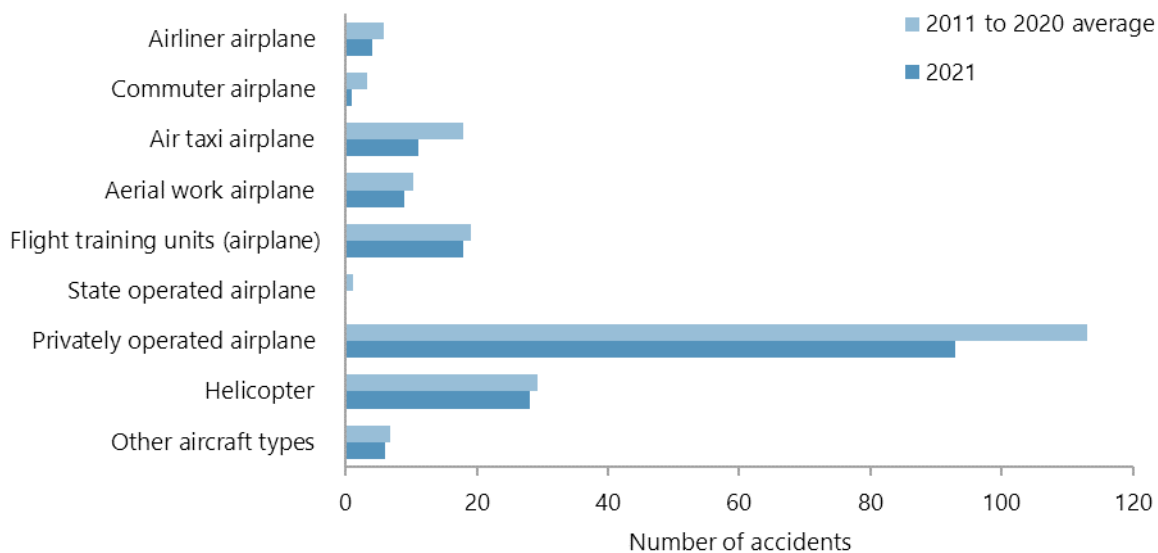
Of the 190 air transportation accidents reported to the TSB in 2021, 137 (72%) involved fixed-wing, powered airplanes (other than ultralights) (Table 1), 28 (15%) involved helicopters, 20 (11%) involved ultralights, and 6 accidents (3%) involved other types of aircraft. In the 10 years from 2011 to 2020, the average proportion of accidents involving each of these 4 types 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 62 accidents that involved commercially-operated aircraft in 2021 (Table 1). This is 15% more than the 54 such accidents recorded in 2020, but 22% below the average of 79 accidents recorded in the 10 years 2011 to 2020.

Commercially-operated Canadian-registered airplanes were involved in 43 accidents in 2021 (Table 2 and Figure 4), and 4 of those involved operations under *Canadian Aviation Regulations* (CARs) Subpart 705, which certifies the operation of airliners. This is equal to the 4 accidents involving Canadian-registered airliners in 2020, and below the average of 6 accidents per year recorded from 2011 to 2020. In 2021, the TSB opened a class 3 investigation ([A21Q0138](#)) into 1 of the 4 accidents in that year that involved airliners.⁵ This occurrence involved the failure of a main gear component during landing.

Figure 4. Accidents involving Canadian-registered aircraft, excluding ultralights, by aircraft type and operation type in 2021, compared with the 2011–2020 average



Also in 2021, there was 1 accident involving a Canadian-registered commuter airplane operating under CARs Subpart 704 (Table 2), as well as 18 accidents involving air taxi operations (CARs Subpart 703)—11

⁵ For an explanation of the different occurrence classifications, see the TSB Policy on Occurrence Classification at [tsb.gc.ca/eng/lois-acts/evenements-occurrences.html](https://www.tsb.gc.ca/eng/lois-acts/evenements-occurrences.html) (last accessed on 19 April 2022).

involving airplanes and 7 involving helicopters. These 18 air taxi accidents are more than the 13 seen in 2020, and remain well below the average of 28 accidents per year occurring between 2011 and 2020. Flight training units operating under CARs Subpart 406 were involved in 18 accidents in 2021, all of which involved airplanes (as opposed to helicopters). On average for the period 2011 to 2020, flight training units were involved in about 20 airplane and 1 helicopter accidents per year.

Overall in 2021, 127 air transportation accidents involved non-commercial (i.e., private aircraft) operations (Table 1), compared to 114 in the preceding year. The 2021 total is 18% below the annual average of 154 accidents from 2011 to 2020. Of the 127 total accidents in the non-commercial (private aircraft) operations category, 93 involved Canadian-registered airplanes (Table 2), with no accidents in 2021 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 2021, 126 accidents involved recreational operators of Canadian-registered aircraft—93 of them in fixed-wing airplanes (Table 2), 9 in helicopters, and 24 in other aircraft. These 126 accidents are 10% more than in the preceding year, but still 15% fewer than the 149 such accidents seen on average between 2011 and 2020.

In addition to commercial, and private operations, 1 accident in 2021 involved a state-operated remotely-piloted aircraft system (RPAS), or “drone”, and 1 additional accident was categorized as having an unknown operation type (Table 1).

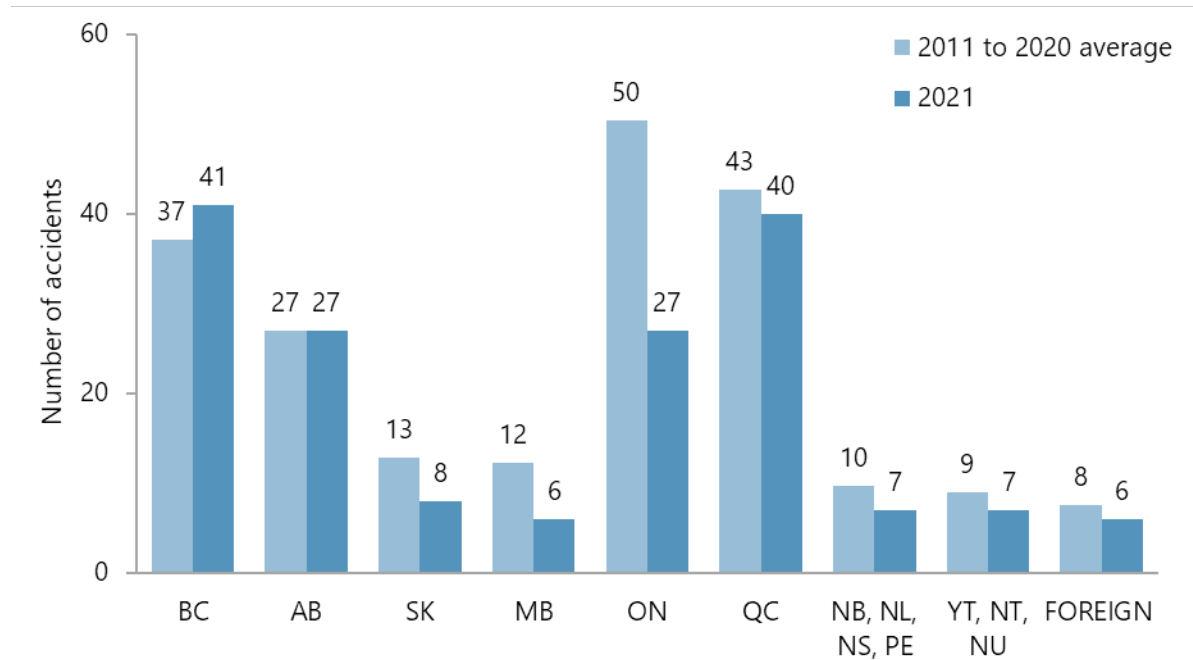
Province or territory

Quebec and British Columbia, with 45 reported accidents each (all aircraft types, including ultralights), were the provinces with the largest number of reported accidents in 2021, surpassing Ontario with 35 (Table 7). Ontario averaged more accidents per year (60) in the 2011–2020 period than any other province or territory, with Quebec having the second-largest average accident count (51) for the same period. British Columbia and Alberta also have high average accident counts compared with the remaining provinces and territories.

Altogether, 6 accidents that were reportable under TSB Regulations occurred outside Canada in 2021. These all involved fixed-wing airplanes: 3 were operating commercially and 3 privately (recreational).

Focusing on Canadian-registered aircraft (excluding ultralights), most provinces saw fewer accidents reported in 2021 than average for the previous 10 years (Table 8 and Figure 5). British Columbia, with 41 accidents reported for the year, was the only location to have more accidents than the 10-year average (of 37).

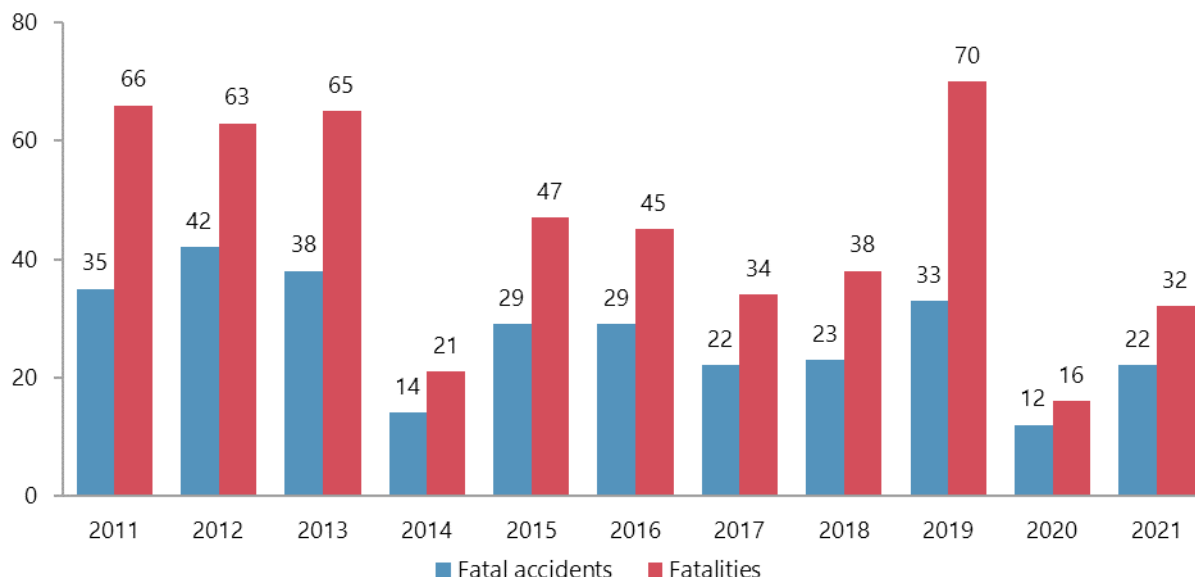
Figure 5. Air transportation accidents involving Canadian-registered aircraft, excluding ultralights, in 2021 compared with the 2011–2020 average, by province or territory



Fatal accidents, fatalities, and serious injuries

The TSB recorded 22 fatal air transportation accidents resulting in 32 fatalities in 2021 (tables 1 and 4, and Figure 6). This is up considerably from 12 fatal accidents resulting in 16 fatalities in 2020, but is still 21% below the average of 28 fatal accidents involving 47 fatalities over the ten years 2011 to 2020. Of the 22 fatal accidents in 2021, 14 involved fixed-wing, powered airplanes, 5 involved helicopters, and 3 involved ultralight aircraft. All of these occurrences involved Canadian-registered aircraft and all but two occurred in Canadian airspace. There were no fatal accidents in Canada during 2021 that involved foreign-registered aircraft.

Figure 6. Fatal accidents and fatalities involving Canadian-registered aircraft, 2011 to 2021



Eight of the 32 air transportation fatalities in 2021 involved commercial operations (Table 4): 1 of them under air taxi regulations (CARs 703), and 7 under aerial work (CARs 702). There were no fatalities involving airliner operations (CARs 705), commuter operations (CARs 704), or flight training operations (CARs 406) in 2021. The remaining 24 (of 32) fatalities in 2021 were linked to privately registered aircraft and involved recreational operators, with none involving an operator holding a PORD (CARs 604).

With regards to type of aircraft, 19 of 32 fatalities in 2021 resulted from accidents in fixed-wing powered airplanes (Table 4). Helicopter accidents resulted in 10 fatalities, and ultralight accidents accounted for 3 deaths. Of the 32 total fatalities, 18 were crew members and 11 were aircraft passengers. There were 3 fatalities among persons on the ground in 2021.

Overall, 44 persons received serious injuries in aircraft accidents in 2021 (Table 5), which is considerably more than the 18 persons seriously injured in 2020, and 41% above the average of 31 in the period 2011 to 2020. Twelve persons received serious injuries in accidents involving commercial operations in 2021: 3 in airliners (CARs 705), none in a commuter aircraft (CARs 704), 1 in the air taxi sector (CARs 703), 7 in aerial work operations (CARs 702), and 1 with a flight-training unit (CARs 406). The 7 persons seriously injured in aerial work operations is almost triple the yearly average of 2.4 serious injuries per year over the preceding 10 years. Also during 2021, 32 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 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 type⁶ 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. Since 2010, however, Transport Canada no longer provides hours-flown activity data breakouts by operator type, because it had 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.

Reporting all hours for all subparts under a single total conflates and confounds airline and commuter activity, as well as the activity of many smaller air operators that carry out operations under multiple subparts of the CARs (commuter, air taxi, and/or aerial work) and report their activity as a single total. Furthermore, movement data as presently reported by Statistics Canada⁷ come from a survey that covers all aircraft movements at major Canadian airports with NAV CANADA air traffic control towers and flight service stations, but as of April 2020, Statistics Canada no longer collects data about movements at small airports without towers or flight service stations, and so activity at smaller airports is not reflected in the data.

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

Without hours-flown and 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 for Canadian-registered aircraft, in Canada and abroad, per 100 000 hours flown

Overall accident rate

Transport Canada collects information about the number of hours flown by Canadian-registered aircraft. The 2021 overall air transportation accident rate of 4.8 per 100 000 hours flown (Table 3) was calculated

⁶ 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).

⁷ Statistics Canada. "Aircraft Movement Statistics," at <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2715> (last accessed on 19 April 2022).

based on the 164 accidents (15% more than 2020) in Canada and abroad involving Canadian-registered airplanes and helicopters (ultralights and other aircraft types are excluded), and the estimated 3 422 000 hours flown by Canadian-registered aircraft (10% above the revised estimate for 2020).⁸ This rate is equal to the 2020 rate of 4.8 accidents per 100 000 flight hours, and only slightly (4%) above the average rate of 4.6 accidents per 100 000 hours flown each year over the previous 10 years. While the number of hours flown in 2021 increased by 10% compared to 2020, the number of reported accidents increased by a similar amount – around 10%. Taken together this means the accident rate statistic held steady.

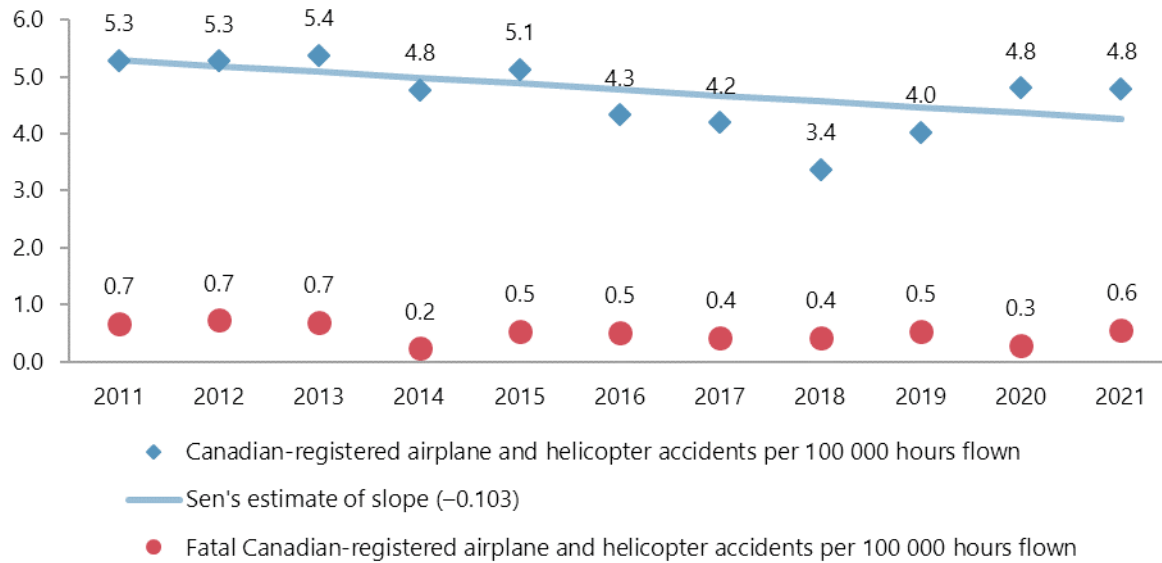
Despite the accident rate rising in 2019 and 2020, it remains statistically plausible that the accident rate for Canadian-registered aircraft has been trending generally downward over the past 11 years. The accident rate has fallen from 5.3 accidents per 100 000 hours flown in 2011 to a low of 3.4 in 2018 before rising again to 4.8 during 2020 and 2021. 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 Canadian-registered aircraft accident rate and fatal 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 2011 to 2021. There was a moderate, statistically significant negative correlation that indicates a downward trend in accident rate per 100 000 hours flown over the period ($\tau_b = -0.4909$, $p = 0.0356$). Sen's estimate of slope, the amount of downward rate change per year, was -0.103 occurrences per 100 000 hours flown per year. A graphical illustration is presented in Figure 7.

Fatal accidents

Figure 7 also shows rate data for fatal accidents. For the 19 fatal accidents involving Canadian-registered airplanes and helicopters in 2021 (ultralights and other aircraft types are excluded), the fatal accident rate was 0.6 per 100 000 hours flown, which is up from the 2020 rate of 0.3, and is above the 2011 to 2020 average of 0.5 fatal accidents per 100 000 hours flown. There is no statistically significant change in the fatal accident rate since 2011 (Kendall's $\tau_b = -0.3091$, $p = 0.1857$).

⁸ Source of estimated hours flown data: Transport Canada (email communication, 23 March 2022).

Figure 7. Canadian-registered airplane and helicopter accidents per 100 000 hours flown, 2011 to 2021



Fatalities

In 2021, 29 fatalities resulted from accidents involving Canadian-registered airplanes and helicopters (excluding ultralights), yielding a rate of 0.8 fatalities per 100 000 hours flown. This fatality rate is higher than the 2020 rate of 0.4, and slightly below the average yearly rate of 0.9 from 2011 to 2020. There is no statistically significant trend (neither upward nor downward) in the fatality rate since 2011 (Kendall's $\tau_b = -0.3818$, $p = 0.1021$) (data not shown).

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

Although data describing the number of aircraft movements at major airports are published by Statistics Canada, since 2020 no data about activity at small airports in Canada have been published or made available to the TSB. Without a complete picture to describe aircraft movements in Canada, the TSB cannot state an overall accident rate per 100 000 aircraft movements in Canada. As discussed in TSB Recommendation A19-05 (see above), and without movement data that are categorized by CARs subpart and aircraft type, it will be difficult for sector stakeholders to assess risks and determine if mitigation strategies being carried out to improve safety are effective.

Dangerous goods released

The TSB recorded 8 accidents in 2021 involving a release of dangerous goods (Table 1). This is above the average of 4.6 per year over the previous 10 years.

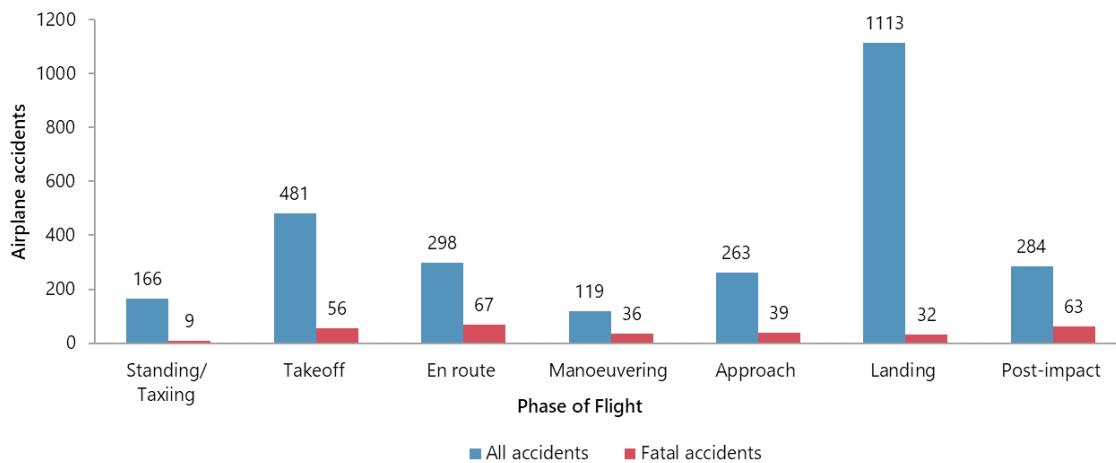
Accident events and phases

For each reported accident, the TSB records 1 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 2011 to 2021. 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 2011 to 2021 involved events in more than a single 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.

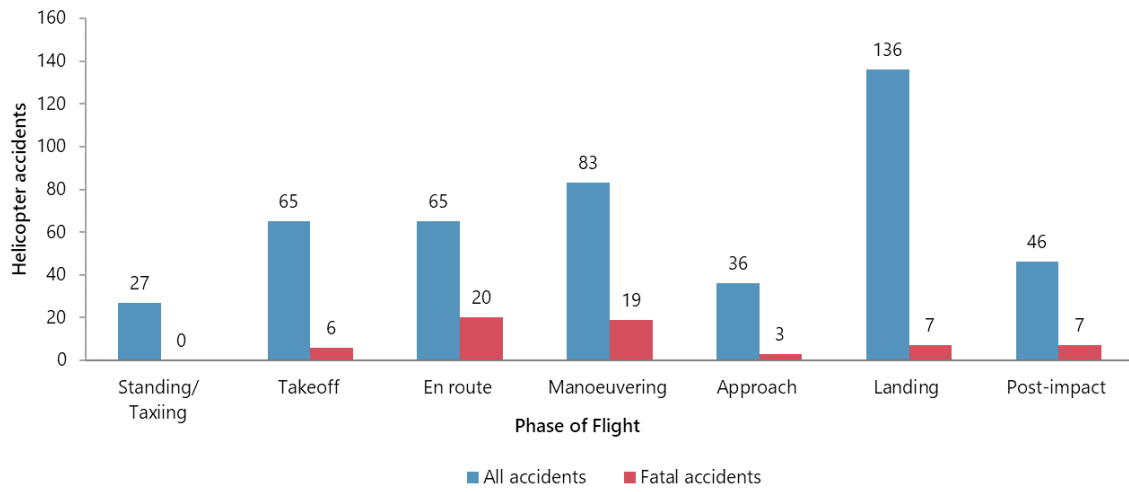
Figures 8 and 9 show the number of airplane and helicopter accidents by phase of flight and event category. Over the past 11 years (2011 to 2021), the distribution of airplane accidents (Table 11 and Figure 8) shows more accidents having events during the landing phase (83 of 137, or 61% of airplane accidents) or takeoff phase (40 of 137, or 29%) than in other phases of flight. Helicopter accidents (Table 12 and Figure 9) had events occurring most often during the landing (12 of 28, or 43%), manoeuvring⁹ (9 of 28; 32%), and takeoff (8 of 28; 29%) phases of flight. Note that for airplanes, although the landing phase is associated with the largest outright number of accidents over the 11-year period, the en route (67) and takeoff phases (56) are associated with the largest numbers of fatal accidents (Table 13 and Figure 9), and manoeuvring with the largest proportion of fatal accidents (36 of 119; 30%). Similarly, for helicopters, the en route (20) and manoeuvring (19) phases are linked to more fatal accidents in the 11-year period than are the approach (3) and landing (7) phases of flight (Table 14 and Figure 10).

Figure 8. Airplane accidents having events in selected phases of flight, 2011 to 2021



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

Figure 9. Helicopter accidents having events in selected phases of flight, 2011 to 2021



Overview of incidents

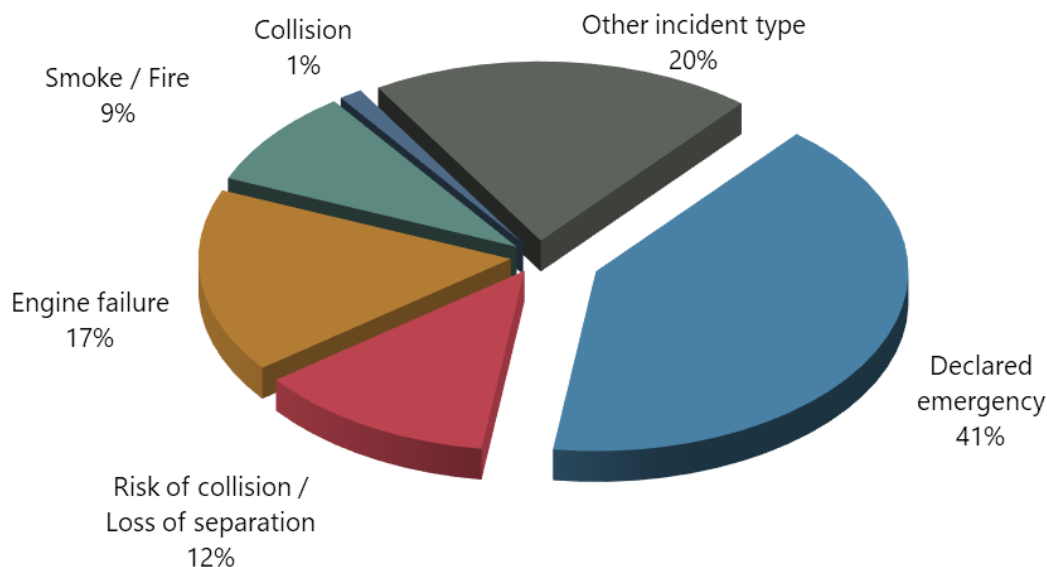
Incident counts

In 2021, 499 air transportation incidents of all types were reported in accordance with the TSB Regulations (Table 9). This represents an increase of 19% from the 421 that were reported in 2020, and is 34% below the average of 751 incidents per year between 2011 and 2020. In the mid part of the past decade 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, 2021 saw a gradual increase in commercial air traffic in Canada,¹⁰ and with it a gradual rise in reported air transportation incidents. While declared emergency (205 incidents) is still the most frequently reported incident category in 2021 (Table 9 and Figure 10), it should be noted that this category is somewhat 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 (62) decreased in proportion from a peak of 18% of all incidents in 2017 to about 12% of incidents in 2021. Incidents involving engine failure (83) rose in 2021 to about 17% of all incidents. Amongst the 20% of 'other' incident types, crew were reported to have been unable to perform their duties 16 times, or in 3% of all reportable incidents in the year, down from 34 incidents (8%) 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 19 April 2022).

Figure 10. Reported air transportation incidents, by type, 2021



The majority of air transportation incidents in 2021 (401 or 80%) occurred in Canada and involved Canadian-registered aircraft (Table 1). However, 72 incidents involving Canadian-registered aircraft occurred outside Canada in 2021. While this count is higher than the 66 incidents outside Canada in 2020, it contrasts with the peak of 181 in 2017 (and again in 2019), and the average of 96 per year in the 10 years from 2011 to 2020. 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, and 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 461 (92%) of the 499 incidents reported to the TSB in 2021 (Table 9). More than half (246, or 53%) 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 47% fewer than the average of 461 incidents per year from 2011 to 2020 that involved Canadian-registered airliners.

Foreign air operators (CARs 701) were involved in just 27 incidents in 2021, or about 5% of all commercial incidents. This is fewer than the 32 incidents recorded in 2020, and was largely because of the continued reduction in transborder and international passenger traffic brought about by COVID-19 restrictions.¹¹

¹¹ Statistics Canada. Table 23-10-0269-01 Transportation activity indicators, Transport Canada DOI: <https://doi.org/10.25318/2310026901-eng> (Last accessed 19 April 2022).

Data tables

Table 1. Reportable air transportation occurrences, by type of occurrence, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accidents	257	291	276	249	251	230	240	201	227	170	190
Accidents in Canada involving Canadian-registered aircraft	241	267	262	238	232	214	222	180	210	165	183
Accidents outside Canada involving Canadian-registered aircraft	6	8	4	4	10	8	11	11	8	5	6
Accidents in Canada involving foreign-registered aircraft	10	17	10	7	9	8	7	11	10	0	1
Accidents¹	257	291	276	249	251	230	240	201	227	170	190
Commercial	99	92	84	82	74	63	97	66	83	54	62
Airliner (CARs 705)	4	5	7	4	9	1	9	8	7	4	4
Commuter (CARs 704)	6	5	3	2	3	3	5	1	4	3	1
Air taxi (CARs 703)	38	33	33	34	23	26	28	23	26	13	18
Aerial work (CARs 702)	27	26	21	17	18	16	18	17	21	13	21
Foreign air operator (CARs 701)	2	2	2	0	0	0	4	3	1	0	0
Flight training units (CARs 406)	19	19	17	25	20	17	32	13	25	20	18
Other commercial	3	3	1	1	1	1	2	1	0	1	0
Private	149	185	179	159	172	164	142	134	143	114	127
Private operators (CARs 604)	5	3	4	3	0	5	0	3	1	2	0
Recreational	142	181	175	156	165	152	135	126	136	109	124
Other private	3	1	0	0	7	8	7	7	6	3	3
State	2	3	6	4	1	0	0	2	1	1	1
Other/Unknown	8	12	9	5	5	3	2	0	0	1	1
Accidents¹	257	291	276	249	251	230	240	201	227	170	190
Airplane	201	205	212	176	197	174	178	153	176	133	137
Helicopter	36	41	27	34	33	28	27	26	28	16	28
Ultralight	17	36	23	32	17	22	25	18	18	17	20
Other ²	3	9	15	8	7	6	10	4	6	4	6
Aircraft involved in accidents^{1,3}	261	296	280	253	259	234	247	207	230	172	194
Airplane	204	209	215	179	202	178	184	159	178	135	140
Helicopters	36	42	27	34	33	28	27	26	28	16	28
Ultralights	17	36	23	32	17	22	25	18	18	17	20
Other ²	4	9	15	8	7	6	11	4	6	4	6
Fatal accidents¹	35	42	38	14	29	29	22	23	33	12	22
Airplane	23	25	25	12	20	22	18	17	27	7	14
Helicopter	8	7	6	0	5	2	2	4	3	2	5
Ultralight	3	8	4	2	4	4	1	2	3	3	3
Other ²	1	2	4	0	0	1	1	0	1	0	0
Persons fatally injured in reportable accidents	66	63	65	21	47	45	34	38	70	16	32
Persons seriously injured in reportable accidents	49	48	22	35	31	18	33	28	31	18	44
Accidents in Canada involving foreign-registered aircraft	10	17	10	7	9	8	7	11	10	0	1
Fatal accidents	2	1	2	2	3	1	0	0	4	0	0
Persons fatally injured	2	1	2	4	4	7	0	0	11	0	0
Persons seriously injured	1	4	0	1	0	0	0	4	1	0	0
Occurrences with a dangerous good release	0	1	4	4	6	7	8	7	8	1	8
Incidents⁴	673	645	689	741	789	833	939	860	915	421	499
Incidents in Canada involving Canadian-registered aircraft	519	482	541	599	653	620	685	608	654	319	401
Incidents outside Canada involving Canadian-registered aircraft	54	48	38	55	58	117	181	161	181	66	72
Incidents in Canada involving foreign-registered aircraft	126	138	129	102	106	117	106	115	113	43	30
Incidents⁴	673	645	689	741	789	833	939	860	915	421	499
Risk of collision / Loss of separation	120	102	115	94	111	139	172	141	138	48	62
Declared emergency	275	266	294	313	333	311	348	340	366	190	205
Engine failure	95	92	83	104	110	110	98	91	103	50	83
Smoke/Fire	88	71	67	89	87	85	100	99	91	25	44
Collision	7	5	15	16	8	18	24	26	31	8	6
Other	88	109	115	125	140	170	197	163	186	100	99

Data extracted 15 March 2022

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, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accidents^{1,2}	230	239	243	212	227	200	208	173	200	153	169
Airplane accidents	192	191	204	170	190	167	171	143	168	133	136
Commercial	71	62	58	55	51	42	71	46	66	45	43
Airliner (CARs 705)	4	5	7	4	9	1	9	8	7	4	4
Commuter (CARs 704)	4	5	3	1	3	3	5	1	4	3	1
Air taxi (CARs 703)	27	19	19	19	12	16	18	18	21	10	11
Aerial work (CARs 702)	14	14	12	8	10	7	12	6	11	8	9
Flight training units (CARs 406)	19	18	16	23	16	16	27	12	23	20	18
Other commercial	3	1	1	0	1	0	0	1	0	0	0
Private	113	122	139	111	138	122	101	96	101	88	93
Private operators (CARs 604)	2	0	3	1	0	5	0	3	1	2	0
Recreational	110	121	136	110	132	114	98	92	97	83	91
Other private	2	1	0	0	6	4	3	2	3	3	2
State	2	1	2	3	1	0	0	2	1	0	0
Other/Unknown	6	6	7	2	1	3	0	0	0	0	0
Helicopter accidents	35	41	27	34	32	27	27	26	27	16	28
Commercial	26	28	22	26	23	18	22	17	16	9	19
Private	9	10	4	7	9	9	5	9	11	6	9
State	0	2	1	1	0	0	0	0	0	1	0
Other/Unknown	0	2	0	0	0	0	0	0	0	0	0
Other aircraft accidents ³	3	7	13	8	7	6	10	4	6	4	6
Fatal accidents^{1,2}	30	33	32	10	23	24	21	21	26	9	19
Airplane accidents	21	25	24	10	18	21	18	17	23	7	14
Commercial	11	6	8	2	6	3	7	4	8	1	2
Airliner (CARs 705)	1	0	0	0	0	0	1	0	0	0	0
Commuter (CARs 704)	1	1	1	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	6	3	5	1	3	1	1	2	6	1	0
Aerial work (CARs 702)	2	2	1	1	2	1	2	2	1	0	2
Flight training units (CARs 406)	1	0	1	0	1	1	3	0	1	0	0
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	10	17	14	8	13	18	11	13	15	6	12
Private operators (CARs 604)	0	0	1	0	0	1	0	1	0	0	0
Recreational	10	17	13	8	13	16	10	13	15	6	12
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	2	2	0	0	0	0	0	0	0	0
Helicopter accidents	8	7	6	0	5	2	2	4	3	2	5
Commercial	6	5	6	0	4	1	2	1	1	1	4
Private	2	1	0	0	1	1	0	3	2	1	1
State	0	1	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	1	3	0	0	1	1	0	1	0	0
Persons fatally injured²	61	54	59	15	40	34	33	36	54	13	29
Persons seriously injured²	43	38	19	28	28	17	27	21	26	14	36
Incidents^{2,4}	573	530	579	654	711	737	866	769	835	385	472
Risk of collision / Loss of separation	106	92	105	84	101	127	159	134	128	47	61
Declared emergency	224	200	231	277	290	263	316	298	318	170	192
Engine failure	87	77	70	94	102	102	88	79	96	44	78
Smoke/Fire	67	59	55	76	79	75	95	85	83	21	41
Collision	7	4	14	15	7	16	23	21	27	8	6
Other	82	98	104	108	132	154	185	152	183	95	94
Accidents involving ultralight aircraft	17	36	23	31	16	22	25	18	18	17	20
Fatal accidents	3	8	4	2	3	4	1	2	3	3	3
Fatalities	3	8	4	2	3	4	1	2	5	3	3
Serious injuries	5	6	3	6	3	1	6	3	4	4	8

Data extracted 15 March 2022

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 hours flown, by Canadian-registered aircraft¹ in Canada and abroad, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accidents	227	232	231	204	222	194	198	169	195	149	164
Fatal accidents	29	32	30	10	23	23	20	21	26	9	19
Fatalities	59	53	57	15	40	33	32	36	54	13	29
Hours flown ² (thousands)	4 286	4 394	4 295	4 272	4 324	4 475	4 719	5 016	4 844	3 098	3 422
Accidents per 100 000 hours	5.3	5.3	5.4	4.8	5.1	4.3	4.2	3.4	4.0	4.8	4.8
Fatal accidents per 100 000 hours	0.7	0.7	0.7	0.2	0.5	0.5	0.4	0.4	0.5	0.3	0.6
Fatalities per 100 000 hours	1.4	1.2	1.3	0.4	0.9	0.7	0.7	0.7	1.1	0.4	0.8

Data extracted 15 March 2022

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

² Hours flown in 2019 to 2021 are estimates. Source: Transport Canada, email to TSB on 2022-03-23.

Table 4. Persons fatally injured in air transportation accidents, by type of operation, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Persons fatally injured	66	63	65	21	47	45	34	38	70	16	32
In Canada, involving Canadian-registered aircraft	63	61	57	15	39	35	32	28	57	16	30
Outside Canada, involving Canadian-registered aircraft	1	1	6	2	4	3	2	10	2	0	2
In Canada, involving foreign-registered aircraft	2	1	2	4	4	7	0	0	11	0	0
Persons fatally injured	66	63	65	21	47	45	34	38	70	16	32
Commercial	40	18	29	4	20	6	15	9	25	2	8
Airliner (CARs 705)	12	0	0	0	0	0	1	0	0	0	0
Commuter (CARs 704)	2	1	5	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	16	12	19	2	12	1	1	5	21	1	1
Aerial work (CARs 702)	8	3	4	2	6	2	7	4	3	1	7
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	2	1	1	0	2	3	5	0	1	0	0
Other commercial	0	1	0	0	0	0	1	0	0	0	0
Private	25	37	33	17	28	39	19	29	45	14	24
Private operators (CARs 604)	2	0	1	0	0	4	0	1	0	0	0
Recreational	23	37	32	17	28	27	17	29	43	14	24
Other private	0	0	0	0	0	8	2	0	2	0	0
State	0	1	0	0	0	0	0	0	0	0	0
Other/Unknown	3	7	3	0	1	0	0	0	0	0	0
Crew members fatally injured	37	40	44	15	29	25	26	20	34	11	18
Commercial	20	11	21	3	10	3	11	3	10	2	4
Airliner (CARs 705)	4	0	0	0	0	0	0	0	0	0	0
Commuter (CARs 704)	2	0	2	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	7	7	14	1	4	1	1	0	8	1	0
Aerial work (CARs 702)	5	2	4	2	4	1	4	3	1	1	4
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	2	1	1	0	2	1	5	0	1	0	0
Other commercial	0	1	0	0	0	0	1	0	0	0	0
Private	16	25	21	12	20	22	15	17	24	9	14
Private operators (CARs 604)	2	0	1	0	0	1	0	1	0	0	0
Recreational	14	25	20	12	20	18	14	17	22	9	14
Other private	0	0	0	0	0	3	1	0	2	0	0
State	0	1	0	0	0	0	0	0	0	0	0
Other/Unknown	3	3	2	0	1	0	0	0	0	0	0
Passengers fatally injured	29	22	20	6	18	20	8	18	36	5	11
Commercial	20	6	8	1	10	3	4	6	15	0	3
Airliner (CARs 705)	8	0	0	0	0	0	1	0	0	0	0
Commuter (CARs 704)	0	1	3	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	9	5	5	1	8	0	0	5	13	0	0
Aerial work (CARs 702)	3	0	0	0	2	1	3	1	2	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	0	0	2	0	0	0	0	0
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	9	12	11	5	8	17	4	12	21	5	8
Private operators (CARs 604)	0	0	0	0	0	3	0	0	0	0	0
Recreational	9	12	11	5	8	9	3	12	21	5	8
Other private	0	0	0	0	0	5	1	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	0	4	1	0	0	0	0	0	0	0	0
Persons on the ground fatally injured	0	1	1	0	0	0	0	0	0	0	3
Persons fatally injured	66	63	65	21	47	45	34	38	70	16	32
Airplane	46	44	46	19	35	37	27	30	60	11	19
Helicopter	15	9	12	0	8	3	5	6	5	2	10
Ultralight	3	8	4	2	4	4	1	2	5	3	3
Other aircraft type	2	2	7	0	0	1	1	0	2	0	0

Data extracted 15 March 2022

Table 5. Persons seriously injured in air transportation accidents, by type of operation, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Persons seriously injured	49	48	22	35	31	18	33	28	31	18	44
In Canada, involving Canadian-registered aircraft	46	39	22	34	28	17	31	23	27	15	42
Outside Canada, involving Canadian-registered Aircraft	2	5	0	0	3	1	2	1	3	3	2
In Canada, involving foreign-registered aircraft	1	4	0	1	0	0	0	4	1	0	0
Persons seriously injured	49	48	22	35	31	18	33	28	31	18	44
Commercial	31	22	11	10	15	8	13	17	13	4	12
Airliner (CARs 705)	10	1	0	0	3	2	8	4	1	1	3
Commuter (CARs 704)	7	2	2	0	0	0	0	0	0	1	0
Air taxi (CARs 703)	9	15	6	5	8	4	0	9	8	0	1
Aerial work (CARs 702)	5	1	3	3	3	2	2	2	2	1	7
Foreign air operator (CARs 701)	0	1	0	0	0	0	0	1	0	0	0
Flight training units (CARs 406)	0	0	0	2	1	0	2	1	2	1	1
Other commercial	0	2	0	0	0	0	1	0	0	0	0
Private	18	26	10	23	16	10	20	11	18	13	32
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	18	26	10	23	14	9	19	8	18	13	32
Other private	0	0	0	0	2	1	1	3	0	0	0
State	0	0	0	0	0	0	0	0	0	1	0
Other/Unknown	0	0	1	2	0	0	0	0	0	0	0
Crew members seriously injured	18	24	13	23	17	8	22	19	16	13	30
Commercial	6	6	4	5	6	3	8	10	2	3	11
Airliner (CARs 705)	0	0	0	0	1	0	3	3	0	1	3
Commuter (CARs 704)	0	2	0	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	2	1	2	2	2	2	0	3	0	0	0
Aerial work (CARs 702)	4	1	2	1	3	1	2	2	1	1	7
Foreign air operator (CARs 701)	0	1	0	0	0	0	0	1	0	0	0
Flight training units (CARs 406)	0	0	0	2	0	0	2	1	1	1	1
Other commercial	0	1	0	0	0	0	1	0	0	0	0
Private	12	18	8	17	11	5	14	9	14	9	19
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	12	18	8	17	9	5	14	7	14	9	19
Other private	0	0	0	0	2	0	0	2	0	0	0
State	0	0	0	0	0	0	0	0	0	1	0
Other/Unknown	0	0	1	1	0	0	0	0	0	0	0
Passengers seriously injured	30	23	8	11	14	8	11	9	13	4	13
Commercial	24	15	6	5	9	4	5	7	9	1	1
Airliner (CARs 705)	10	0	0	0	2	2	5	1	0	0	0
Commuter (CARs 704)	7	0	2	0	0	0	0	0	0	1	0
Air taxi (CARs 703)	7	14	4	3	6	2	0	6	7	0	1
Aerial work (CARs 702)	0	0	0	2	0	0	0	0	1	0	0
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	1	0	0	0	1	0	0
Other commercial	0	1	0	0	0	0	0	0	0	0	0
Private	6	8	2	5	5	4	6	2	4	3	12
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	6	8	2	5	5	4	5	1	4	3	12
Other private	0	0	0	0	0	0	1	1	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	0	0	0	1	0	0	0	0	0	0	0
Persons on the ground seriously injured	1	1	1	1	0	2	0	0	2	1	1
Persons seriously injured	49	48	22	35	31	18	33	28	31	18	44
Airplane	36	31	13	21	23	10	23	23	26	10	26
Helicopter	8	7	6	6	5	6	3	2	1	3	7
Ultralight	5	6	3	7	3	1	6	3	4	4	8
Other aircraft type	0	4	0	1	0	1	1	0	0	1	3

Data extracted 15 March 2022

Table 6. Accidents involving Canadian-registered airplanes and helicopters, by type of operation,^{1,2} 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Airplane accidents	192	191	204	170	190	167	171	143	168	133	136
Training	28	27	24	27	16	20	31	14	28	23	17
Pleasure/Travel	102	109	127	96	125	112	92	83	83	74	85
Business	7	4	2	9	1	3	1	7	5	4	4
Forest fire management	1	2	3	2	2	1	0	1	2	1	4
Test/Demonstration/Ferry	4	4	4	5	2	2	4	1	3	2	3
Aerial application	4	3	7	4	5	6	6	5	6	8	1
Inspection	0	1	1	0	1	0	1	0	0	0	0
Air transport	35	28	26	22	22	16	27	26	29	15	14
Air ambulance	1	1	0	1	0	3	1	1	1	1	2
Sightseeing	2	6	1	1	1	0	1	1	2	0	1
Other/Unknown	10	8	11	4	16	5	8	6	9	5	5
Fatal airplane accidents	21	25	24	10	18	21	18	17	23	7	14
Training	1	1	2	1	1	1	3	0	1	1	0
Pleasure/Travel	10	16	11	7	12	15	9	12	12	5	10
Business	0	1	1	1	0	1	0	1	1	0	1
Forest fire management	0	0	0	0	1	0	0	0	0	0	1
Test/Demonstration/Ferry	0	1	1	0	0	1	0	0	1	0	0
Aerial application	0	0	1	0	0	2	1	1	0	0	0
Inspection	0	0	0	0	0	0	0	0	0	0	0
Air transport	8	4	5	1	2	1	2	2	6	1	0
Air ambulance	0	0	0	0	0	0	0	0	0	0	0
Sightseeing	1	0	0	0	1	0	0	0	0	0	0
Other/Unknown	1	3	3	0	2	0	3	2	2	0	2
Helicopter accidents	35	41	27	34	32	27	27	26	27	16	28
Training	2	1	1	2	5	1	7	1	2	0	1
Pleasure/Travel	9	8	2	7	8	9	4	6	9	6	6
Business	0	3	1	0	1	0	0	2	1	0	1
Forest fire management	2	1	3	0	2	0	2	2	1	1	3
Test/Demonstration/Ferry	1	0	1	0	0	0	0	1	0	0	2
Aerial application	1	5	0	1	2	1	3	1	3	2	1
Inspection	2	2	2	3	0	1	0	1	0	0	0
Air transport	13	9	8	18	10	7	3	3	9	2	6
Air ambulance	0	1	2	0	0	0	1	0	0	0	0
Sightseeing	0	1	0	1	0	0	1	1	0	0	0
Other/Unknown	5	10	7	2	4	8	6	8	2	5	8
Fatal helicopter accidents	8	7	6	0	5	2	2	4	3	2	5
Training	1	1	0	0	0	0	1	0	0	0	0
Pleasure/Travel	2	0	0	0	0	1	0	2	2	1	1
Business	0	1	0	0	1	0	0	0	0	0	0
Forest fire management	1	0	0	0	0	0	0	0	0	0	1
Test/Demonstration/Ferry	1	0	0	0	0	0	0	1	0	0	0
Aerial application	0	0	0	0	1	0	0	0	0	0	0
Inspection	1	0	1	0	0	0	0	0	0	0	0
Air transport	1	1	3	0	3	0	0	0	1	0	1
Air ambulance	0	0	1	0	0	0	0	0	0	0	0
Sightseeing	0	1	0	0	0	0	0	0	0	0	0
Other/Unknown	1	3	1	0	0	1	1	1	0	1	2

Data extracted 15 March 2022

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, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accidents	257	291	276	249	251	230	240	201	227	170	190
Newfoundland and Labrador	3	5	3	5	6	5	4	4	3	2	4
Prince Edward Island	0	0	0	0	0	0	2	0	0	0	0
Nova Scotia	5	5	5	3	6	2	3	2	1	1	2
New Brunswick	3	3	2	6	2	5	7	1	8	2	2
Quebec	58	71	66	69	51	34	44	31	50	33	45
Ontario	63	67	72	67	74	50	62	53	53	39	35
Manitoba	17	18	13	12	14	17	10	7	17	9	6
Saskatchewan	18	9	19	12	13	10	13	13	12	17	8
Alberta	22	35	29	33	23	38	35	32	29	25	29
British Columbia	43	54	51	30	42	53	39	36	38	34	45
Yukon	8	8	4	4	6	2	4	4	3	0	3
Northwest Territories	6	5	3	3	2	3	2	5	4	1	2
Nunavut	4	3	4	1	2	3	3	1	1	2	3
Other airspace under Canadian air traffic control	1	0	1	0	0	0	1	1	0	0	0
Outside Canada	6	8	4	4	10	8	11	11	8	5	6
Fatal accidents	35	42	38	14	29	29	22	23	33	12	22
Newfoundland and Labrador	0	0	0	0	1	0	0	0	2	1	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	1	1	1	0	0	0	0	0	0
New Brunswick	0	0	0	1	0	1	0	0	1	0	0
Quebec	5	10	5	2	7	7	4	2	9	4	6
Ontario	6	10	9	5	6	5	4	6	6	1	5
Manitoba	1	3	2	0	1	1	3	0	1	0	0
Saskatchewan	3	1	2	1	2	2	2	1	0	0	0
Alberta	4	6	4	1	3	4	3	5	5	3	4
British Columbia	10	9	10	2	4	8	3	4	5	3	2
Yukon	1	1	0	0	0	0	1	0	2	0	0
Northwest Territories	2	0	1	0	0	0	0	1	1	0	0
Nunavut	1	1	0	0	0	0	0	0	0	0	2
Other airspace under Canadian air traffic control	0	0	1	0	0	0	0	0	0	0	0
Outside Canada	1	1	3	1	4	1	2	4	1	0	2
Persons fatally injured	66	63	65	21	47	45	34	38	70	16	32
Newfoundland and Labrador	0	0	0	0	1	0	0	0	8	1	2
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	1	1	1	0	0	0	0	0	0
New Brunswick	0	0	0	2	0	2	0	0	1	0	0
Quebec	9	11	5	2	16	15	6	4	14	5	7
Ontario	9	19	19	8	10	5	9	8	16	1	6
Manitoba	1	4	5	0	1	2	4	0	3	0	0
Saskatchewan	7	5	3	2	3	2	3	1	0	0	0
Alberta	5	6	5	1	4	4	5	6	8	6	8
British Columbia	16	15	17	3	7	12	4	6	12	3	3
Yukon	1	1	0	0	0	0	1	0	4	0	0
Northwest Territories	4	0	1	0	0	0	0	3	2	0	0
Nunavut	12	1	0	0	0	0	0	0	0	0	4
Other airspace under Canadian air traffic control	0	0	3	0	0	0	0	0	0	0	0
Outside Canada	1	1	6	2	4	3	2	10	2	0	2

Data extracted 15 March 2022

Table 8. Accidents and fatal accidents in Canada and outside Canada involving Canadian-registered aircraft,¹ 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Accidents	230	239	243	212	227	200	208	173	200	153	169
Newfoundland and Labrador	3	5	3	4	6	4	3	2	2	2	3
Prince Edward Island	0	0	0	0	0	0	1	0	0	0	0
Nova Scotia	3	3	5	2	5	2	2	1	1	1	2
New Brunswick	3	3	2	6	2	5	5	1	8	2	2
Quebec	52	52	57	57	44	28	39	28	41	29	40
Ontario	56	54	59	53	66	43	51	44	46	32	27
Manitoba	16	15	13	11	13	17	10	7	12	9	6
Saskatchewan	17	8	18	10	12	10	12	13	12	16	8
Alberta	18	30	27	31	21	36	30	27	27	23	27
British Columbia	39	46	44	27	39	43	35	30	36	32	41
Yukon	7	7	4	4	6	1	4	2	2	0	2
Northwest Territories	6	5	3	2	2	3	2	5	4	1	2
Nunavut	3	3	3	1	1	2	3	1	1	2	3
Other airspace under Canadian air traffic control	1	0	1	0	0	0	0	1	0	0	0
Outside Canada	6	8	4	4	10	6	11	11	8	4	6
Fatal accidents	30	33	32	10	23	24	21	21	26	9	19
Newfoundland and Labrador	0	0	0	0	1	0	0	0	1	1	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	0	0	0	0	0	0	0	0
New Brunswick	0	0	0	1	0	1	0	0	1	0	0
Quebec	5	4	3	1	6	5	4	2	5	3	5
Ontario	4	9	6	3	5	3	4	5	5	0	3
Manitoba	1	3	2	0	0	1	3	0	1	0	0
Saskatchewan	3	1	2	1	2	2	2	1	0	0	0
Alberta	3	5	4	1	3	4	3	4	5	2	4
British Columbia	9	8	9	2	2	7	2	4	5	3	2
Yukon	1	1	0	0	0	0	1	0	1	0	0
Northwest Territories	2	0	1	0	0	0	0	1	1	0	0
Nunavut	1	1	0	0	0	0	0	0	0	0	2
Other airspace under Canadian air traffic control	0	0	1	0	0	0	0	0	0	0	0
Outside Canada	1	1	3	1	4	1	2	4	1	0	2
Persons fatally injured	61	54	59	15	40	34	33	36	54	13	29
Newfoundland and Labrador	0	0	0	0	1	0	0	0	7	1	2
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	1	0	0	0	0	0	0	0	0
New Brunswick	0	0	0	2	0	2	0	0	1	0	0
Quebec	9	5	3	1	15	7	6	4	8	4	6
Ontario	7	18	16	4	9	3	9	7	9	0	4
Manitoba	1	4	5	0	0	2	4	0	3	0	0
Saskatchewan	7	5	3	2	3	2	3	1	0	0	0
Alberta	4	5	5	1	4	4	5	5	8	5	8
British Columbia	15	14	16	3	4	11	3	6	12	3	3
Yukon	1	1	0	0	0	0	1	0	2	0	0
Northwest Territories	4	0	1	0	0	0	0	3	2	0	0
Nunavut	12	1	0	0	0	0	0	0	0	0	4
Other airspace under Canadian air traffic control	0	0	3	0	0	0	0	0	0	0	0
Outside Canada	1	1	6	2	4	3	2	10	2	0	2

Data extracted 15 March 2022

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 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Incidents¹	673	645	689	741	789	833	939	860	915	421	499
Risk of collision / Loss of separation	120	102	115	94	111	139	172	141	138	48	62
Declared emergency	275	266	294	313	333	311	348	340	366	190	205
Engine failure	95	92	83	104	110	110	98	91	103	50	83
Smoke/Fire	88	71	67	89	87	85	100	99	91	25	44
Collision	7	5	15	16	8	18	24	26	31	8	6
Control difficulties	31	33	25	40	29	35	34	41	25	25	24
Crew unable to perform duties	26	40	58	37	46	66	78	57	87	34	16
Dangerous goods-related	0	1	3	4	0	2	0	2	0	0	3
Depressurization	16	15	14	12	16	14	21	13	23	5	16
Fuel shortage	6	7	2	6	17	15	17	10	5	3	3
Failure to remain in landing area	7	10	9	20	17	19	22	11	9	10	10
Incorrect fuel	0	0	0	0	0	1	3	0	3	4	3
Slung load released	1	1	4	5	14	15	21	23	28	11	17
Transmission or gearbox failure	1	2	0	1	1	3	1	0	1	0	0
Incidents^{1,2}	673	645	689	741	789	833	939	860	915	421	499
Commercial	637	609	656	699	741	785	888	815	869	393	461
Airliner (CARs 705)	446	409	450	429	437	490	614	547	572	220	246
Commuter (CARs 704)	76	83	95	106	87	79	73	60	67	50	51
Air taxi (CARs 703)	28	22	30	79	114	104	102	90	104	59	83
Aerial work (CARs 702)	15	11	12	34	48	43	55	55	59	35	56
Foreign air operator (CARs 701)	109	117	113	82	75	94	80	91	86	32	27
Flight training units (CARs 406)	4	3	4	5	6	12	11	7	13	7	8
Other commercial	2	1	1	0	2	5	1	2	4	2	2
Private	39	35	31	37	52	45	56	51	56	27	37
Private operators (CARs 604)	19	20	18	22	19	19	32	19	25	12	17
Recreational	20	15	13	14	15	14	11	9	10	6	15
Other private	1	0	0	1	18	12	13	23	22	10	6
State	13	20	20	13	15	8	15	11	8	5	7
Other/Unknown	5	4	4	12	15	22	13	12	12	2	3
Incidents^{1,2}	673	645	689	741	789	833	939	860	915	421	499
Airplane	655	633	673	715	749	795	892	819	842	400	457
Helicopter	20	17	20	30	47	38	52	43	77	21	41
Ultralight/Other aircraft type ³	0	0	0	3	8	7	4	4	6	0	1
Aircraft involved in incidents^{1,4}	776	742	800	830	887	957	1063	970	1016	452	532
Airplanes	756	725	780	797	832	912	1006	921	931	431	490
Helicopters	20	17	20	30	47	38	53	45	79	21	41
Ultralight / Other aircraft type ³	0	0	0	3	8	7	4	4	6	0	1
Incidents¹	673	645	689	741	789	833	939	860	915	421	499
Newfoundland and Labrador	14	17	29	22	30	31	27	35	29	11	16
Prince Edward Island	1	0	2	0	1	4	1	2	1	1	1
Nova Scotia	19	17	11	22	19	17	22	28	28	13	6
New Brunswick	7	7	7	8	9	9	4	7	11	3	6
Quebec	126	107	122	89	116	109	139	141	147	75	76
Ontario	174	155	166	157	152	166	230	144	166	89	115
Manitoba	31	31	31	51	54	47	49	43	44	26	42
Saskatchewan	11	18	27	32	21	25	19	16	24	15	19
Alberta	82	81	103	98	117	110	107	104	106	43	40
British Columbia	76	101	99	132	154	137	101	123	129	56	74
Yukon	3	4	5	6	6	5	5	2	8	1	6
Northwest Territories	30	17	16	25	17	9	20	22	9	11	12
Nunavut	19	19	10	20	15	15	15	19	15	4	11
Other airspace under Canadian air traffic control	27	23	23	24	20	32	19	14	17	7	3
Outside Canada	54	48	38	55	58	117	181	161	181	66	72

Data extracted 15 March 2022

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 incidents¹ in Canada and outside Canada involving Canadian-registered aircraft, 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Incidents¹	573	530	579	654	711	737	866	769	835	385	472
Risk of collision / Loss of separation	106	92	105	84	101	127	159	134	128	47	61
Declared emergency	224	200	231	277	290	263	316	298	318	170	192
Engine failure	87	77	70	94	102	102	88	79	96	44	78
Smoke/Fire	67	59	55	76	79	75	95	85	83	21	41
Collision	7	4	14	15	7	16	23	21	27	8	6
Control difficulties	27	31	22	36	28	30	33	40	25	24	24
Crew unable to perform duties	26	38	56	35	44	65	74	55	86	30	15
Dangerous goods-related	0	1	3	3	0	2	0	2	0	0	2
Depressurization	15	13	10	10	14	13	19	11	23	5	15
Fuel shortage	5	4	2	3	15	11	16	5	4	3	3
Failure to remain in landing area	7	9	7	17	17	14	18	10	8	10	10
Incorrect fuel	0	0	0	0	0	1	3	0	3	4	3
Slung load released	1	1	4	4	13	15	21	23	28	11	17
Transmission or gearbox failure	1	1	0	0	1	3	1	0	1	0	0
Incidents by operator type^{1,2}	573	530	579	654	711	737	866	769	835	385	472
Commercial	547	504	552	622	674	705	825	741	799	363	437
Airliner (CARs 705)	443	409	449	427	436	489	613	546	571	218	246
Commuter (CARs 704)	76	83	95	106	87	79	73	60	67	50	51
Air taxi (CARs 703)	28	21	30	79	114	104	102	90	104	58	83
Aerial work (CARs 702)	15	11	12	31	47	43	55	55	59	35	56
Flight training units (CARs 406)	4	3	4	5	6	12	11	7	13	7	8
Other commercial	0	0	0	0	1	2	0	1	3	1	2
Private	29	28	25	29	40	37	48	33	45	22	34
Private operators (CARs 604)	11	14	13	17	16	19	32	19	24	12	17
Recreational	18	14	12	11	14	12	11	8	10	6	14
Other private	1	0	0	1	10	6	5	6	12	5	4
State	13	17	19	11	15	6	13	10	8	5	7
Other/Unknown	3	2	4	9	14	14	10	12	10	1	3
Incidents^{1,2}	573	530	579	654	711	737	866	769	835	385	472
Airplane	555	519	563	631	672	699	819	728	762	364	431
Helicopter	20	16	20	27	46	38	52	43	77	21	41
Ultralight / Other aircraft type ³	0	0	0	3	8	6	4	4	6	0	0
Aircraft involved in incidents^{1,4}	667	619	681	730	800	843	981	874	927	415	504
Airplanes	647	603	661	700	746	799	924	825	842	394	463
Helicopters	20	16	20	27	46	38	53	45	79	21	41
Ultralight / Other aircraft type ³	0	0	0	3	8	6	4	4	6	0	0
Incidents by province/territory¹	573	530	579	654	711	737	866	769	835	385	472
Newfoundland and Labrador	10	10	17	13	20	22	22	22	15	8	14
Prince Edward Island	0	0	1	0	1	4	1	2	1	1	1
Nova Scotia	14	9	9	19	17	12	17	20	26	11	5
New Brunswick	5	7	4	6	9	9	3	6	8	2	6
Quebec	104	84	96	81	103	99	127	122	125	68	73
Ontario	146	127	142	139	141	148	202	129	146	85	109
Manitoba	30	30	27	45	51	44	47	38	44	25	40
Saskatchewan	11	14	26	27	19	25	18	14	24	13	19
Alberta	76	75	93	93	110	103	102	97	100	38	35
British Columbia	68	87	93	125	137	118	100	114	124	52	70
Yukon	3	3	3	5	6	5	3	2	8	1	5
Northwest Territories	30	17	16	25	17	8	20	21	8	10	12
Nunavut	16	15	10	16	14	15	14	16	14	3	10
Other airspace under Canadian air traffic control	6	4	4	5	8	8	9	5	11	2	1
Outside Canada	54	48	38	55	58	117	181	161	181	66	72

Data extracted 15 March 2022

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 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Standing/Taxiing	18	17	23	16	19	16	20	13	14	4	6	166
Collision with object	6	7	8	6	3	5	9	6	5	1	5	61
Collision with moving aircraft	1	2	1	3	5	4	3	3	2	1	3	28
Nosedown/Overturned	3	3	5	1	3	2	2	0	1	0	0	20
Landing gear collapse/retracted	3	0	2	1	2	1	3	1	2	0	0	15
Loss of control	0	3	4	1	0	0	0	0	0	0	0	8
Other events	9	9	11	9	12	13	14	10	10	3	4	104
Takeoff	41	54	40	48	53	47	45	35	48	30	40	481
Collision with terrain	11	21	11	10	18	13	15	7	14	4	12	136
Loss of control	12	17	7	18	9	11	7	5	11	3	10	110
Collision with object	9	17	8	11	18	12	8	11	17	12	10	133
Takeoff/landing event	13	19	9	11	11	14	16	11	11	8	13	136
Power loss	11	6	13	16	12	10	11	5	12	6	2	104
Other events	28	33	26	34	50	30	35	31	38	28	36	369
En route	31	30	34	23	29	19	34	27	28	24	19	298
Power loss	14	15	15	14	8	12	15	11	12	8	5	129
Precautionary/forced landing / Ditching	13	9	8	7	5	4	5	6	8	4	6	75
Collision with terrain	8	7	10	5	4	5	5	5	6	3	2	60
Component/system related	1	2	3	2	3	0	3	1	2	3	1	21
Other events	18	14	18	14	26	8	24	22	21	19	15	199
Manoeuvring	12	11	12	4	11	13	11	12	15	14	4	119
Collision with terrain	6	8	7	1	7	6	7	4	5	6	1	58
Loss of control	1	4	1	1	2	4	5	4	0	3	1	26
Collision with object	1	1	2	1	2	3	1	2	5	3	0	21
Power loss	3	1	0	0	1	2	1	1	1	2	1	13
Other events	9	2	5	3	4	6	2	8	12	7	3	61
Approach	23	21	32	28	25	17	21	25	27	24	20	263
Collision with terrain	7	6	6	7	10	4	7	5	8	1	3	64
Power loss	2	0	11	6	2	3	6	6	5	6	3	50
Collision with object	8	1	7	9	7	6	7	3	2	5	0	55
Component/system related	5	3	3	4	2	0	2	3	3	2	1	28
Precautionary/forced landing / Ditching	2	2	7	7	1	1	4	5	7	4	2	42
Loss of control	3	4	5	1	4	1	0	1	5	0	2	26
Other events	8	14	10	9	18	12	13	18	21	18	16	157
Landing	113	111	116	99	118	113	95	92	93	80	83	1113
Missed or went off runway	27	26	28	14	30	30	21	17	23	20	18	254
Collision with object	28	26	18	20	29	24	23	29	25	18	19	259
Landing gear collapsed/retracted	24	22	25	17	27	27	23	19	17	18	18	237
Nosedown/Overturned	17	20	20	17	27	33	29	23	21	19	25	251
Loss of control	17	27	19	22	2	3	6	3	4	0	3	106
Hard landing	22	20	13	14	10	17	19	16	17	7	11	166
Collision with terrain	16	18	12	21	20	12	7	11	10	8	4	139
Wheels-up landing	3	7	10	7	10	9	4	5	7	1	3	66
Precautionary/forced landing / Ditching	3	9	11	5	12	18	18	7	7	9	7	106
Other events	49	42	45	28	77	77	50	58	53	53	50	582
Post-impact	11	19	13	16	37	57	41	44	31	9	6	284
Fire/Explosion/Fumes	6	7	7	6	13	9	5	7	5	4	0	69
Other events	5	12	6	12	24	49	37	38	26	5	6	220

Data extracted 15 March 2022

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 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Standing/Taxiing	6	4	1	4	2	0	1	4	3	0	2	27
Collision with terrain	2	1	0	0	1	0	0	0	0	0	0	4
Loss of control	2	0	0	2	1	0	0	0	2	0	1	8
Collision with object	0	0	0	2	1	0	1	1	1	0	0	6
Other events	5	4	1	4	0	0	0	4	2	0	2	22
Takeoff	7	7	7	9	4	6	5	5	6	1	8	65
Loss of control	4	2	0	5	1	4	4	1	3	0	4	28
Collision with terrain	3	1	2	1	2	1	1	2	2	0	1	16
Collision with object	0	4	2	2	1	0	1	2	3	0	2	17
Power loss	2	0	1	1	0	1	0	0	0	0	1	6
Other events	1	2	2	4	1	3	2	2	4	1	6	28
En route	10	9	5	7	4	5	3	6	4	5	7	65
Collision with terrain	3	3	1	3	1	1	1	2	2	1	2	20
Power loss	2	3	1	1	1	3	0	1	1	1	2	16
Precautionary/forced landing / Ditching	0	1	1	0	1	0	0	0	0	0	1	4
Component/system related	2	0	1	0	1	0	0	0	1	0	2	7
Other events	7	6	4	5	3	4	3	5	1	5	5	48
Manoeuvring	10	11	8	4	8	8	7	4	9	5	9	83
Collision with terrain	6	5	5	2	3	5	3	2	2	2	3	38
Loss of control	2	3	2	2	2	3	4	0	2	2	4	26
Collision with object	3	3	2	1	1	3	3	1	4	1	2	24
Operations related event	2	2	1	0	2	5	3	1	6	1	1	24
Power loss	0	2	1	0	2	1	1	0	1	0	0	8
Other events	3	6	2	2	5	5	5	2	7	4	3	44
Approach	6	7	3	3	3	5	2	2	1	1	3	36
Collision with terrain	1	1	0	0	0	1	0	0	0	0	2	5
Power loss	0	2	0	1	1	3	0	0	0	0	1	8
Loss of control	1	1	0	1	1	2	1	1	0	0	0	8
Collision with object	2	0	0	1	0	1	1	0	0	0	0	5
Other events	3	5	3	2	2	4	1	1	1	1	2	25
Landing	7	13	12	12	18	16	13	12	12	9	12	136
Hard landing	4	4	1	3	1	0	1	2	0	0	0	16
Collision with terrain	2	4	0	3	6	0	0	2	1	1	0	19
Loss of control	1	1	2	4	6	2	1	2	3	6	2	30
Collision with object	2	2	5	5	1	4	3	6	2	5	1	36
Other events	2	4	9	5	10	4	5	5	7	5	3	59
Post-impact	4	2	3	2	5	11	1	6	5	2	5	46
Fire/Explosion/Fumes	2	1	2	0	1	0	0	0	3	2	2	13
Other events	2	1	1	2	4	11	1	6	4	0	4	36

Data extracted 15 March 2022

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 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Standing/Taxiing	1	1	1	0	1	2	1	0	1	1	0	9
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	1	0	1	2	1	0	1	1	0	9
Takeoff	4	6	4	2	9	5	6	5	7	1	7	56
Collision with terrain	1	4	3	0	4	4	5	2	5	0	6	34
Loss of control	2	2	2	1	4	4	2	2	2	0	2	23
Collision with object	1	2	0	0	1	0	1	1	1	0	0	7
Takeoff/landing event	1	1	1	1	0	0	1	0	0	1	1	7
Power loss	1	0	0	1	1	1	1	0	1	0	0	6
Other events	4	3	2	0	7	1	4	4	3	1	5	34
En route	9	8	9	3	7	5	5	6	10	2	3	67
Power loss	2	1	0	0	0	2	0	1	2	0	0	8
Precautionary/forced landing / Ditching	1	0	0	0	0	1	0	0	1	0	1	4
Collision with terrain	5	6	7	3	4	4	3	5	6	1	2	46
Component/system related	0	0	0	0	1	0	0	0	0	0	0	1
Other events	4	2	5	1	6	2	4	5	7	1	3	40
Manoeuvring	1	4	3	2	4	5	4	5	4	4	0	36
Collision with terrain	1	4	2	1	4	4	4	3	4	3	0	30
Loss of control	0	2	0	1	0	2	2	4	0	1	0	12
Collision with object	0	0	0	0	1	1	1	0	0	1	0	4
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Other events	1	0	1	1	0	1	1	3	2	1	0	11
Approach	6	5	5	1	5	4	4	4	4	0	1	39
Collision with terrain	4	3	5	0	3	3	3	2	2	0	1	26
Power loss	1	0	1	0	0	0	0	0	0	0	0	2
Collision with object	2	0	0	0	1	1	1	0	0	0	0	5
Component/system related	0	0	0	0	0	0	1	0	2	0	0	3
Precautionary/forced landing / Ditching	1	0	0	0	0	0	0	0	0	0	0	1
Loss of control	0	1	2	0	0	1	0	0	1	0	0	5
Other events	1	4	1	1	2	2	2	2	3	0	0	18
Landing	5	3	3	4	4	5	0	1	4	0	3	32
Missed or went off runway	0	0	0	1	0	1	0	0	0	0	0	2
Collision with object	1	0	0	0	1	1	0	1	2	0	2	8
Landing gear collapsed/retracted	0	0	0	0	0	0	0	0	0	0	0	0
Nosedown/Overturned	1	1	2	1	0	0	0	1	2	0	0	8
Loss of control	0	0	1	0	0	0	0	0	0	0	0	1
Hard landing	0	1	0	0	0	0	0	0	0	0	0	1
Collision with terrain	2	3	2	2	2	4	0	0	1	0	0	16
Wheels-up landing	0	0	0	0	0	0	0	0	0	0	0	0
Precautionary/forced landing / Ditching	0	0	1	0	1	0	0	0	0	0	0	2
Other events	1	2	0	2	1	3	0	1	2	0	2	14
Post-impact	6	8	8	4	10	9	5	8	4	1	0	63
Fire/Explosion/Fumes	4	6	7	3	10	7	4	6	3	1	0	51
Other events	2	2	1	2	0	2	1	2	1	0	0	13

Data extracted 15 March 2022

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 2011 to 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	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	2	0	2	0	1	0	0	0	0	1	0	6
Loss of control	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	1	0	1	0	1	0	0	0	0	0	0	3
Collision with object	0	0	1	0	1	0	0	0	0	0	0	2
Power loss	1	0	0	0	0	0	0	0	0	0	0	1
Other events	0	0	0	0	0	0	0	0	0	1	0	1
En route	2	3	2	0	2	1	1	4	3	0	2	20
Collision with terrain	2	2	1	0	1	1	0	2	2	0	1	12
Power loss	0	0	0	0	0	0	0	0	1	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	0	1	0	0	1
Other events	1	2	2	0	1	1	1	3	0	0	1	12
Manoeuvring	4	3	2	0	1	1	1	1	1	2	3	19
Collision with terrain	3	1	2	0	1	0	1	1	0	1	2	12
Loss of control	0	1	1	0	0	0	1	0	0	1	1	5
Collision with object	1	0	0	0	0	1	1	0	0	0	0	3
Operations related event	0	2	0	0	0	0	1	0	1	1	0	5
Power loss	0	1	0	0	1	0	0	0	0	0	0	2
Other events	2	2	0	0	0	1	1	0	1	1	1	9
Approach	1	1	0	0	0	0	0	0	0	0	1	3
Collision with terrain	0	0	0	0	0	0	0	0	0	0	1	1
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	1	1	0	0	0	0	0	0	0	0	0	2
Collision with object	0	0	0	0	0	0	0	0	0	0	0	0
Other events	0	1	0	0	0	0	0	0	0	0	1	2
Landing	1	2	0	0	2	0	1	0	1	0	0	7
Hard landing	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	1	2	0	0	1	0	0	0	0	0	0	4
Loss of control	0	0	0	0	1	0	0	0	0	0	0	1
Collision with object	0	0	0	0	0	1	0	2	0	0	0	3
Other events	0	0	0	0	0	0	0	0	1	0	0	1
Post-impact	1	1	2	0	1	0	0	0	0	1	1	7
Fire/Explosion/Fumes	1	1	1	0	1	0	0	0	0	1	1	6
Other events	0	0	1	0	0	0	0	0	0	0	0	1

Data extracted 15 March 2022

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 engine 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 include individuals flying for pleasure. Included are flights on which it is not possible to transport people or cargo on a “for-hire” basis.