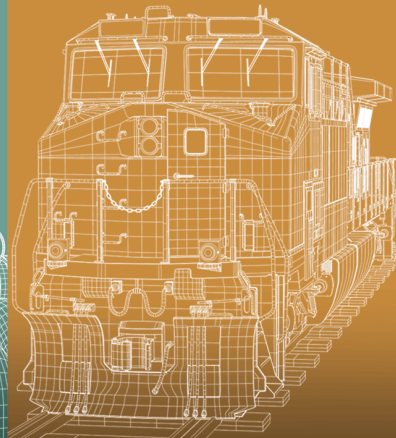
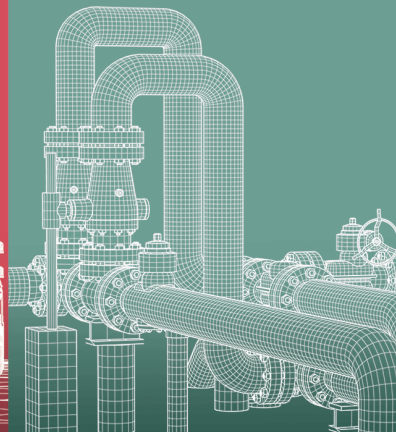




Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



STATISTICAL SUMMARY

Air Transportation Occurrences in 2020

Canada 

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Statistical summary: air transportation occurrences in 2020

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Le présent rapport est également disponible en français.

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Statistical Summary

Air Transportation Occurrences in 2020

The 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 airplane 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 2020 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 9 April 2021. 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.

COVID-19 impacts on civil aviation in Canada

In early 2020, a new coronavirus began to affect air passenger travel in China and Hong Kong. By mid-March, broad travel restrictions were in place in Canada and around the world in an effort to contain the virus. The impact on commercial aviation was immediate, widespread, and lasting, with air transportation activity in Canada being greatly reduced during most of 2020. In April of 2020, total aircraft movements at major airports¹ in Canada were roughly 75% fewer than in 2019. While domestic itinerant movements slowly resumed over the remainder of the year, total traffic continued to be greatly reduced. In January of 2021, total aircraft movements at major Canadian airports remained 30% fewer than in January of 2020.² Major Canadian airlines carried 797 000 passengers in January of 2021, which is 89% fewer than a year before.³ Notably, Statistics Canada data for major airports indicate that itinerant (point-to-point) movements were down 41% in calendar year 2020 compared to 2019, but local movements (returning to where they took off) were down by only 20% for the same periods.⁴ Unfortunately, data for small airports (without NAV CANADA towers or flight service stations) are no longer available from Statistics Canada.

Although passenger air carriers greatly reduced their activity during 2020, other sectors of the air transportation industry were less affected by COVID-19 restrictions. There is evidence that smaller aircraft continued to operate during much of 2020 at levels that were similar to 2019. Flight training units, aerial work, and air taxi operations, as well as recreational flying, were less affected than major airlines. Statistics Canada estimates of aviation fuel consumption⁵ are revealing: compared with 2019, average monthly consumption of kerosene-type jet fuel in 2020 (April to November) fell by almost 75%. This is consistent with the activity decrease seen for large passenger aircraft. However, consumption of aviation gasoline—used in smaller, piston-powered aircraft—did not decrease (on average) for the same period.

The above patterns in civil aviation activity informs the discussion of accident and incident counts for 2020, which is presented below.

¹ Major airports are the 90 Canadian airports with NAV CANADA air traffic control towers and flight service stations.

² Statistics Canada. 2021. "Aircraft movement statistics: Major airports, January 2021." *The Daily*. 30 March. Statistics Canada Catalogue no. 11-001-X. <https://www150.statcan.gc.ca/n1/daily-quotidien/210330/dq210330d-eng.htm> (last accessed on 8 April 2021).

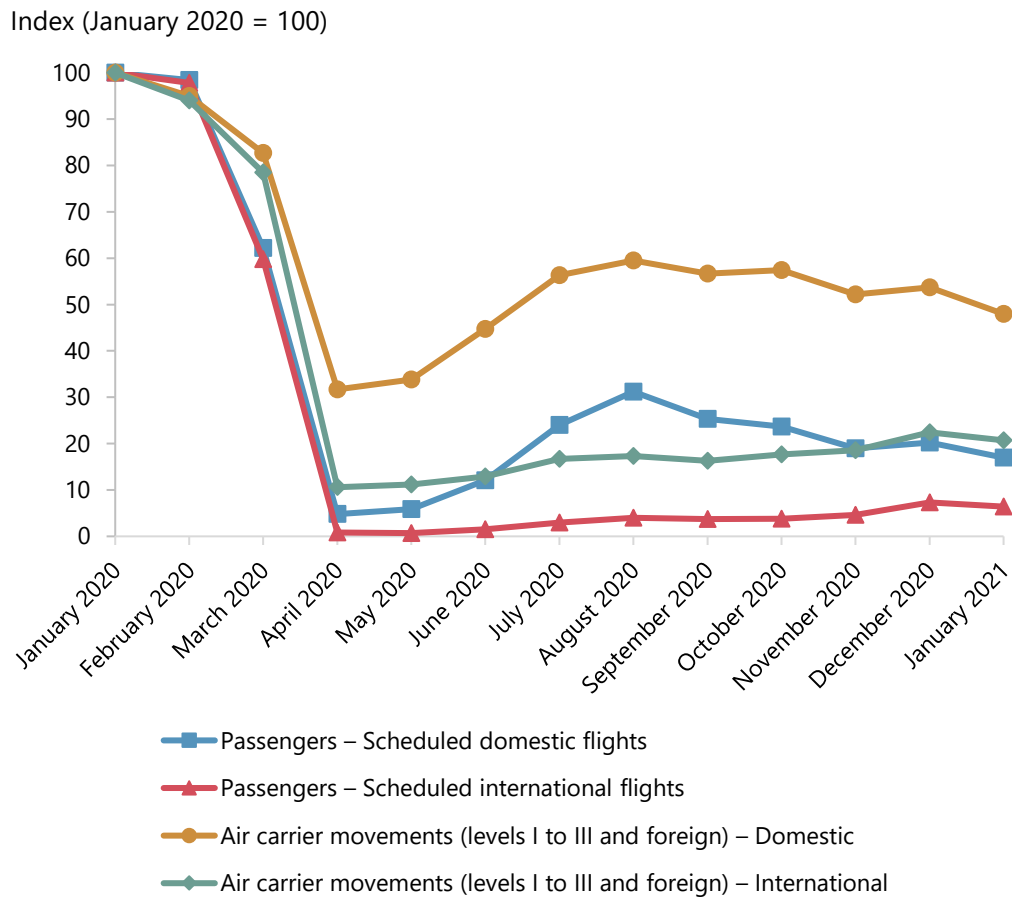
³ Ibid.

⁴ Statistics Canada. From the following tables:

- 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.
<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2310000201>. DOI: <https://doi.org/10.25318/2310000201-eng>.
- 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.
<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2310000901>. DOI: <https://doi.org/10.25318/2310000901-eng>.

⁵ Statistics Canada. Table 25-10-0076-01 Petroleum products supply and disposition, monthly, inactive. <https://www150.statcan.gc.ca/t1/tbl1/en/cv!recreate.action?pid=2510007601&selectedNodeIds=2D6,3D2,3D6&checkedLevels=0D1,3D1&refPeriods=20190101,20201201&dimensionLayouts=layout3,layout2,layout2,layout3,layout3&vectorDisplay=false> (last accessed on 8 April 2021).

Figure 1. Indexes of passengers carried and air carrier movements, domestic and international, January 2020 to January 2021 (Source: Statistics Canada)⁶



⁶ Statistics Canada. 2021. "Monthly civil aviation statistics, January 2021." *The Daily*. 30 March. Statistics Canada Catalogue no. 11-001-X. <https://www150.statcan.gc.ca/n1/daily-quotidien/210330/dq210330c-eng.htm> (last accessed on 8 April 2021).

Figure 2: Domestic consumption of kerosene-type jet fuel, 2019 and 2020⁷

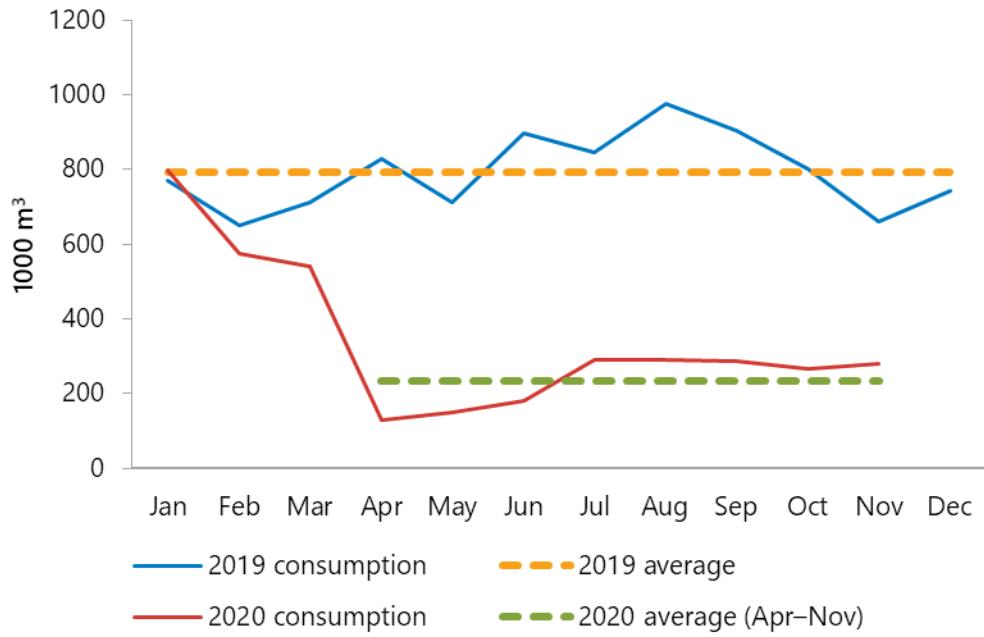
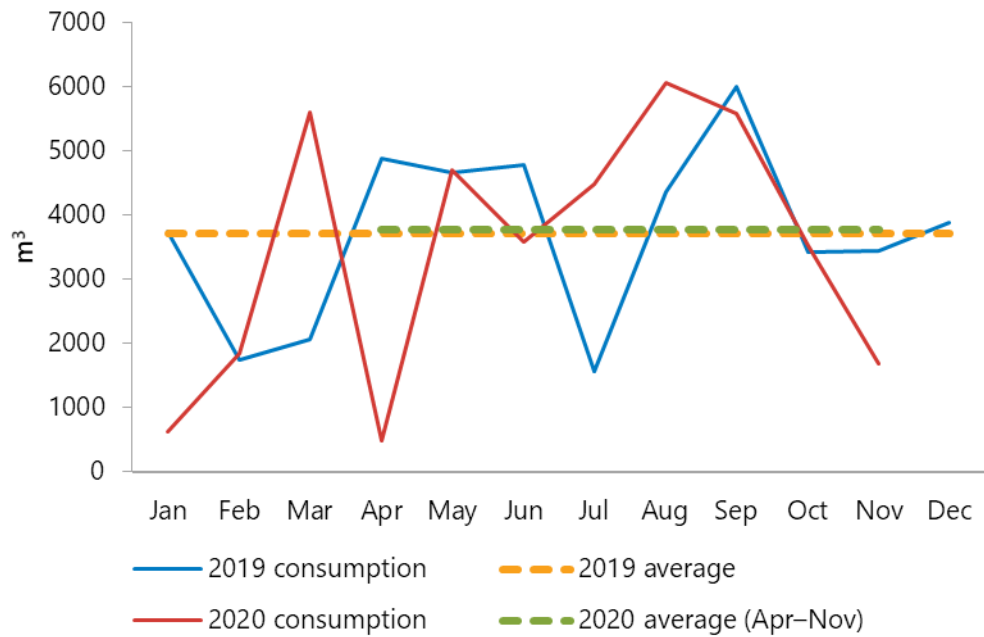


Figure 3: Domestic consumption of aviation gasoline, 2019 and 2020⁸



⁷ Statistics Canada. Table 25-10-0076-01 Petroleum products supply and disposition, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510007601> (last accessed on 8 April 2021).

⁸ Ibid.

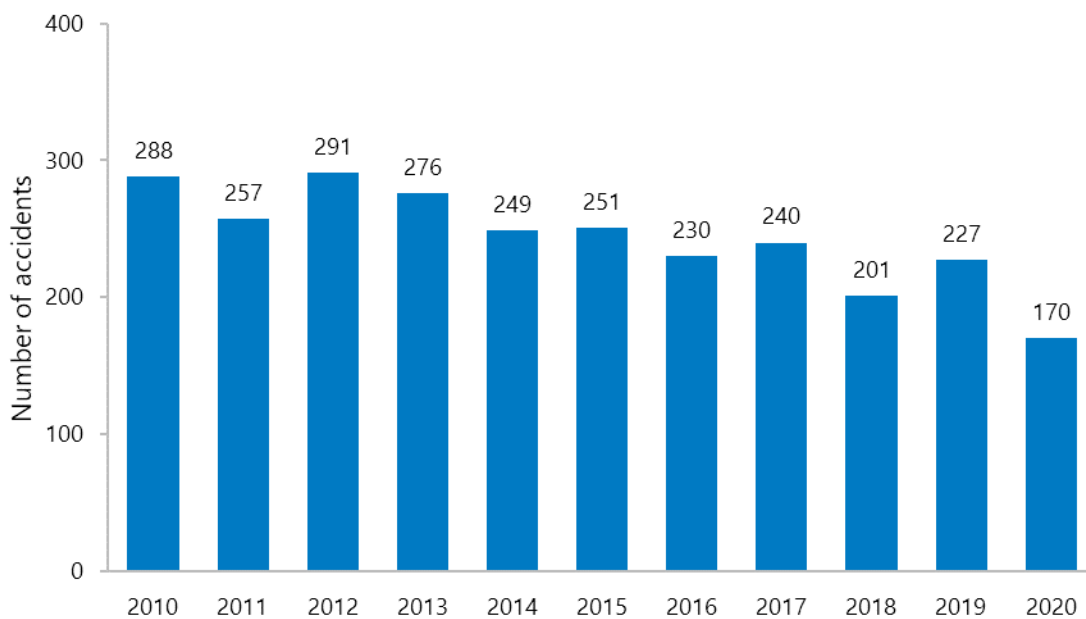
Overview of accidents and fatalities

Accident counts

Air transportation occurrences are reportable to the TSB if they occur in Canada. They are also reportable outside of Canada if they involve Canadian-registered aircraft, and meet the criteria laid out in the TSB Regulations.⁹

In 2020, a total of 170 air transportation accidents were reported to the TSB (Table 1 and Figure 4). This number is 25% lower than the previous year's total of 227 accidents and 32% below the average of 251 accidents reported in the prior 10 years, 2010 to 2019. Most (165) of the accidents in 2020 took place in Canada and involved Canadian-registered aircraft. Five accidents involving Canadian-registered aircraft took place outside Canada, and no accidents in Canada involved foreign-registered aircraft. In general, the number of air transportation accidents has been decreasing in the last decade.

Figure 4: Reported air transportation accidents, 2010 to 2020



There were 153 accidents involving Canadian-registered aircraft (excluding ultralights) in 2020 (Table 2). This is below the 2019 count of 200 accidents, and some 30% below the average of 218 accidents in the preceding 10 years (2010 to 2019). If the 17 accidents involving ultralights are included in the count, there were 170 accidents involving Canadian-registered aircraft in 2020.

⁹ *Transportation Safety Board Regulations*, at <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2014-37/index.html> (last accessed on 31 March 2021).

Aircraft type

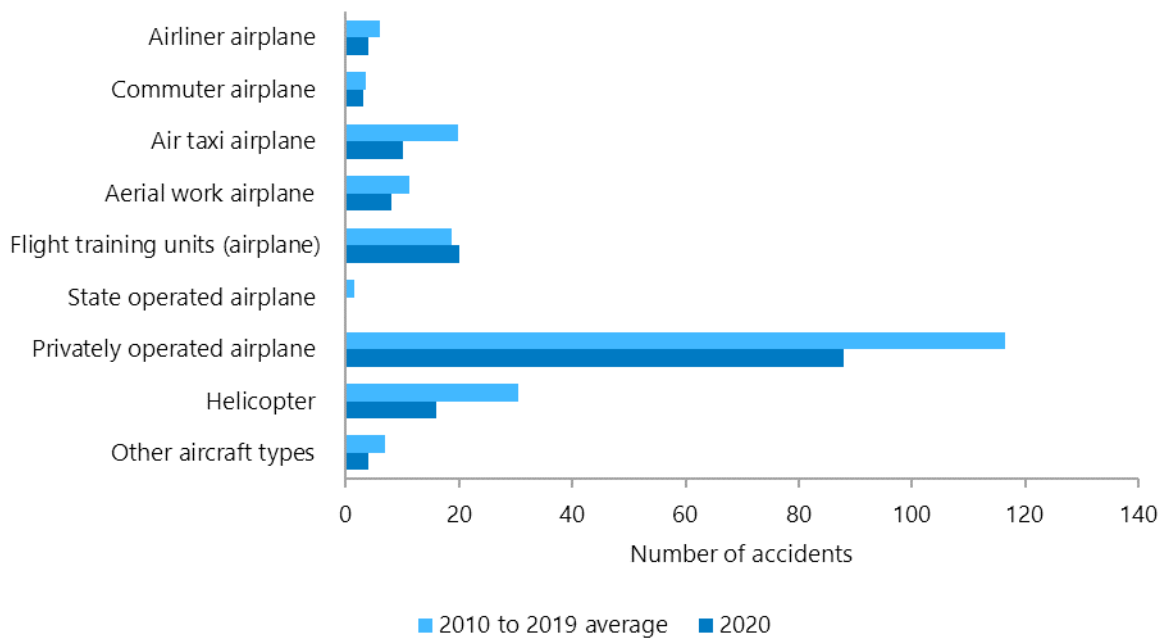
Of the 170 air transportation accidents reported to the TSB in 2020, 133 (78%) involved fixed-wing, powered airplanes (other than ultralights) (Table 1), 16 (9%) involved helicopters, 17 (10%) involved ultralights, and 4 accidents (2%) involved other types of aircraft. In the 10 years from 2010 to 2019, 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 54 accidents that involved commercially-operated aircraft in 2020 (Table 1). This is fewer than the 83 such accidents recorded in 2019, and 36% below the average of 85 accidents recorded in the 10 years 2010–2019.

Commercially-operated Canadian-registered airplanes were involved in 45 accidents in 2020 (Table 2 and Figure 5), and 4 of those involved operations under *Canadian Aviation Regulations* (CARs) Subpart 705, which certifies the operation of airliners. This is fewer than the 7 accidents involving Canadian-registered airliners in 2019, and below the average of 6 accidents per year recorded from 2010 to 2019. In 2020, the TSB opened formal investigations ([A20Q0013](#), [A20P0013](#), and [A20C0107](#)) into 3 of the 4 accidents in that year that involved airliners. All 3 are Class 3 investigations.¹⁰ Two involved runway excursions and 1 involved abnormal runway contact.

Figure 5: Accidents involving Canadian-registered aircraft, excluding ultralights, by aircraft type and operation type in 2020, compared with the 2010–2019 average



¹⁰ For an explanation of the different occurrence classifications, see the TSB Policy on Occurrence Classification at <https://www.tsb.gc.ca/eng/lois-acts/evenements-occurrences.html> (last accessed on 31 March 2021).

Also in 2020, there were 3 accidents involving Canadian-registered commuter airplanes operating under CARs Subpart 704 (Table 2), as well as 13 accidents involving air taxi operations (CARs Subpart 703)—10 involving airplanes and 3 involving helicopters. These 13 air taxi accidents are substantially fewer than the 26 seen in 2019, and far below the average of 31 accidents per year between 2010 and 2019. Flight training units operating under CARs Subpart 406 were involved in 20 accidents in 2020, all of which involved airplanes (as opposed to helicopters). On average for the period 2010 to 2019, flight training units reported about 19 airplane and 1 helicopter accidents per year.

Overall in 2020, 114 air transportation accidents involved non-commercial (i.e., private aircraft) operations (Table 1), compared to 143 in the preceding year. This is 28% below the annual average of 159 accidents from 2010 to 2019. Of the 114 total accidents in the non-commercial (private aircraft) operations category, 88 involved Canadian-registered airplanes (Table 2), and 2 of these 88 were operating under CARs Subpart 604 with a Private Operator Registration Document (PORD).

Most operators of non-commercial (private) aircraft are classified as recreational operators. Recreational operators are responsible for a significant amount of flying activity, and are involved in many accidents each year. In 2020, 109 accidents involved recreational operators (Table 1). This figure is down 18% from the previous year's count, and 28% below the average (152) for the period 2010 to 2019.

In addition to commercial, private and recreational operations, 1 accident in 2020 involved a remotely-piloted aircraft system (RPAS), or "drone", which was operated with a special flight operations certificate (SFOC) and was categorized as an 'other' operator type.

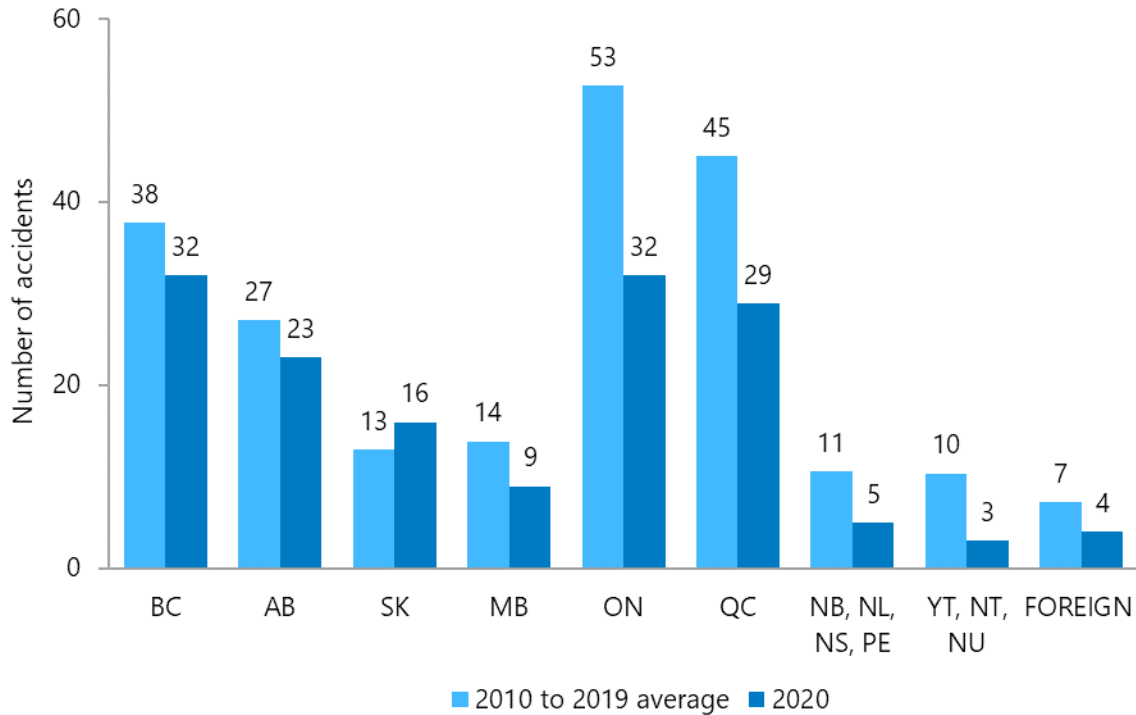
Province or territory

Ontario, with 39 reported accidents (all aircraft types, including ultralights), was the province with the largest number of reported accidents in 2020, as it was in the previous 3 years (Table 7; data not shown). Ontario also averaged more accidents per year (63) in the 2010–2019 period than any other province or territory, with Quebec having the second-largest average accident count (54) for the same period. British Columbia and Alberta also have high average accident counts compared with the remaining provinces and territories.

Altogether, 5 accidents that were reportable under *TSB Regulations* occurred outside Canada in 2020. These involved 3 airplanes, 1 helicopter and 1 ultralight.

The number of accidents involving Canadian-registered aircraft (excluding ultralights) by province or territory (Table 8) is shown in Figure 6. There were 32 accidents reported in Ontario involving Canadian-registered aircraft in 2020, which is 39% below the average number (53) for the years 2010 to 2019. Saskatchewan was the only province to have an increase in the number of accidents in 2020, with 16 accidents during 2020 compared to 12 in 2019, a 33% increase.

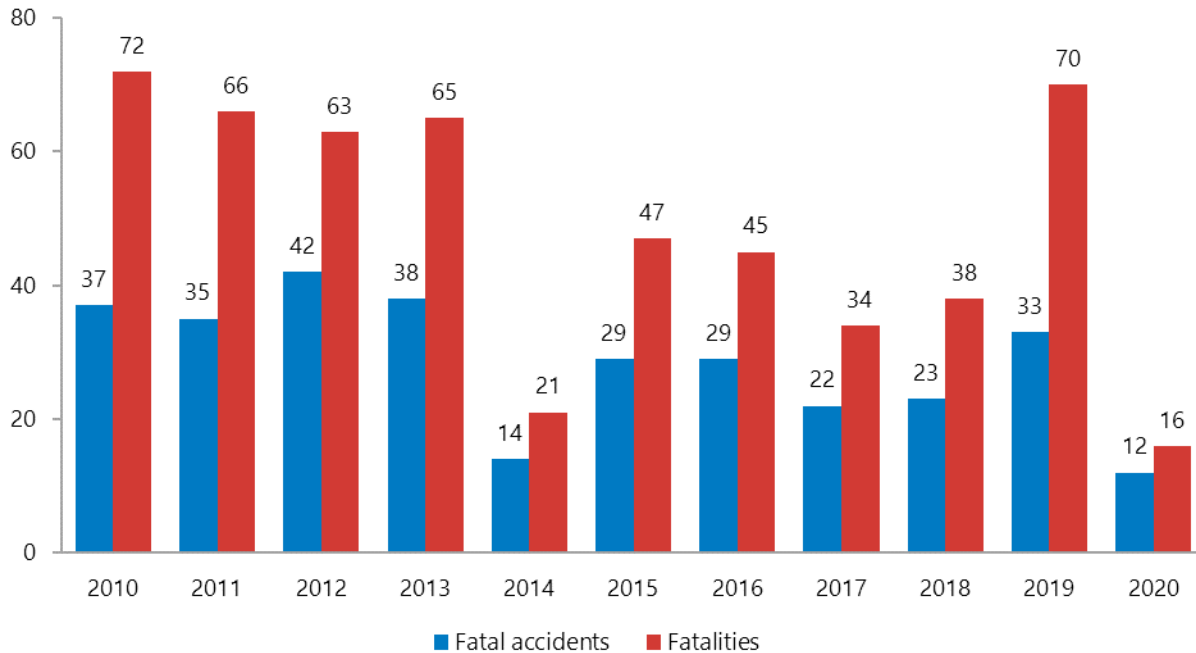
Figure 6: Air transportation accidents involving Canadian-registered aircraft, excluding ultralights, in 2020 compared with the 2010 to 2019 average, by province or territory



Fatal accidents, fatalities, and serious injuries

The TSB recorded 12 fatal air transportation accidents involving 16 fatalities in 2020 (tables 1 and 4, and Figure 7). This is down considerably from 33 fatal accidents involving 70 fatalities in 2019, and is less than the corresponding averages of 30 fatal accidents involving 52 fatalities over the ten years 2010 to 2019. Of the 12 fatal accidents in 2020, 7 involved fixed-wing, powered airplanes, 2 involved helicopters, and 3 involved ultralight aircraft. All of these occurrences involved Canadian-registered aircraft operating inside Canadian airspace. There were no fatal accidents in Canada during 2020 that involved foreign-registered aircraft.

Figure 7: Fatal accidents and fatalities involving Canadian-registered aircraft, 2010 to 2020



Two of the 16 air transportation fatalities in 2020 involved commercial operations (Table 4): 1 of them under air taxi regulations (CARs 703), and 1 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 2020. The remaining 14 (of 16) fatalities in 2020 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, 11 of 16 fatalities in 2020 resulted from accidents in fixed-wing powered airplanes (Table 4). Helicopter accidents resulted in 2 fatalities, and ultralight accidents accounted for the remaining 3. Of the 16 total fatalities, 11 were crew members and 5 were aircraft passengers. There were no fatalities among persons on the ground in 2020.

Overall, 17 persons received serious injuries in aircraft accidents in 2020 (Table 5), which is considerably fewer than the 31 persons seriously injured in 2019, and 48% below the average of 33 in the period 2010 to 2019. Only 3 persons received serious injuries in accidents involving commercial operations in 2020: 1 in a commuter aircraft (CARs 704), 1 in aerial work operations (CARs 702), and 1 with a flight-training unit (CARs 406). Also in 2020, 13 persons incurred serious injuries in recreational operations, and 1 person sustained serious injuries in a state-operated aircraft.

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 type¹¹ 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 Canada¹² 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

¹¹ 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).

¹² Statistics Canada, "Aircraft Movement Statistics," at <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2715> (last accessed on 6 April 2021).

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 2020 overall air transportation accident rate of 5.8 per 100 000 hours flown (Table 3) was calculated based on the 149 accidents (24% below 2019) in Canada and abroad involving Canadian-registered airplanes and helicopters (ultralights and other aircraft types are excluded), and the estimated 2 550 000 hours flown by Canadian-registered aircraft (48% below 2019).¹³ This rate is above the 2019 rate of 4.0 accidents per 100 000 flight hours, and 24% above the average rate of 4.7 accidents per 100 000 hours flown each year over the previous 10 years. While the number of hours flown decreased by almost half in 2020 compared to 2019, the number of reported accidents decreased by a lesser amount – around 25%. Taken together this means the accident rate statistic went up.

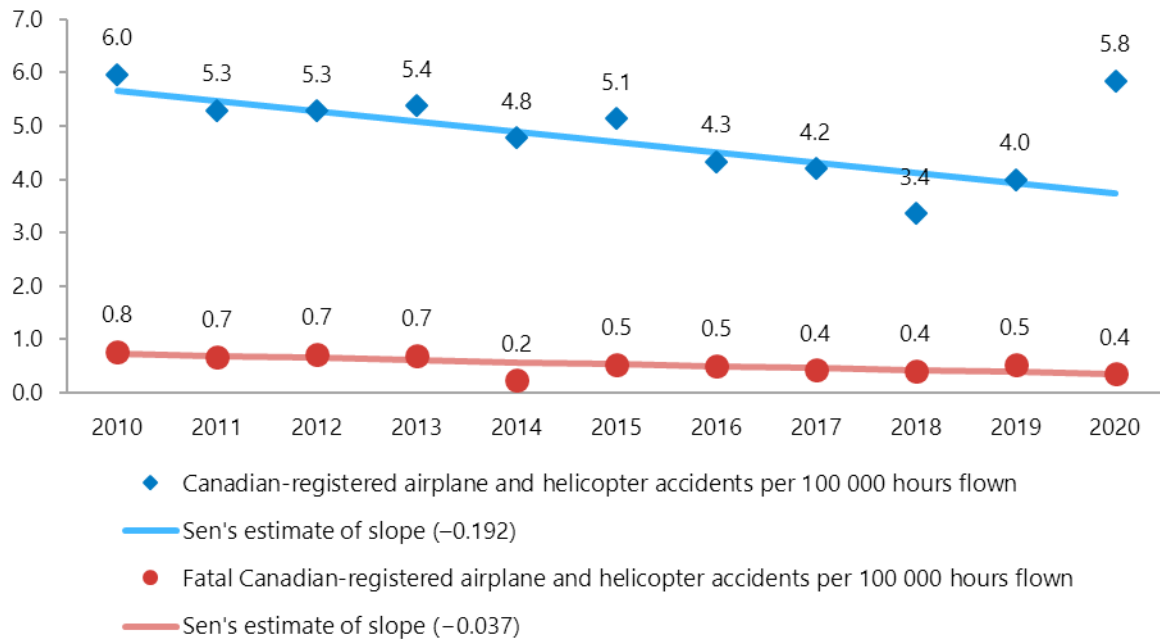
Despite the upward jump in accident rate in 2020, it remains statistically plausible that the accident rate for Canadian-registered aircraft has been trending generally downward over the past 11 years. The accident rate has fallen from about 6 accidents per 100 000 hours flown in 2010 to 4 in 2019, a reduction of 33%, before rising again to 5.8 during 2020. 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 2010 to 2020. There was a moderate, negative correlation that indicates a downward trend in accident rate per 100 000 hours flown over the period ($\tau_b = -0.5273$, $p = 0.0240$). Sen's estimate of slope, the amount of downward rate change per year, was -0.192 occurrences per 100 000 hours flown per year. A graphical illustration is presented in Figure 8.

Fatal accidents

Figure 8 also illustrates a trend line for fatal accidents. For the 12 fatal accidents involving Canadian-registered aircraft in 2020, the fatal accident rate was 0.4 per 100 000 hours flown. That rate is down from the 2019 rate of 0.5, and is below the 2010 to 2019 average of 0.5 fatal accidents per 100 000 hours flown. Although there is a downward trend to the series of fatal accident rates since 2010 (Kendall's $\tau_b = -0.6000$, $p = 0.0102$), the slope of the trend is quite small: Sen's estimate of slope is -0.037 fatal accidents per 100 000 hours flown per year.

¹³ Source of estimated hours flown data: Transport Canada (email communication, 2 March 2021).

Figure 8: Canadian-registered aircraft accidents per 100 000 hours flown, 2010 to 2020



Fatalities

In 2020, 13 fatalities resulted from accidents involving Canadian-registered airplanes and helicopters (excluding ultralights), yielding a rate of 0.5 fatalities per 100 000 hours flown. This fatality rate is substantially lower than the 2019 rate of 1.1, and below the average yearly rate of 1.0 from 2010 to 2019. Like the accident rate and fatal accident rate, the fatality rate per 100 000 hours flown has shown a downward trend since 2010 (Kendall's $\tau_b = -0.5636$, $p = 0.0158$). The rate of change (Sen's estimate) is -0.096 fatalities per 100 000 hours flown per year.

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, in 2020 data about activity at small airports in Canada were no longer 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 actually working.

Dangerous goods released

Only 1 accident in 2020 was reported to involve a release of dangerous goods (Table 1). This is lower than the numbers for the preceding several years, and below 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 type, from 2010 to 2020. 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 2010 to 2020 involved events in more than a single phase of flight, so the number of accidents shown in the tables, and in figures 9 and 10, sum to more than the total number of accidents.

Figures 9 and 10 show the number of airplane and helicopter accidents by phase of flight and event category. Over the past 11 years (2010 to 2020), the distribution of airplane accidents (Figure 9) shows more accidents having events during the landing phase (56% of airplane accidents) or takeoff phase (24%) than in other phases of flight. Helicopter accidents (Figure 10) had events occurring more often during the landing (43%), manoeuvring¹⁴ (24%), and en route (20%) phases of flight. Note that for airplanes, although the landing phase is associated with the largest number of accidents, the en route, takeoff, and approach phases are associated with larger numbers of fatal accidents, and manoeuvring with the largest proportion of fatal accidents. Similarly, for helicopters, the en route and manoeuvring phases are linked to more fatal accidents than are the approach and landing phases.

¹⁴ Manoeuvring (i.e., low altitude/aerobatic flight operations) does not occur on all flights.

Figure 9: Airplane accidents having events in selected phases of flight, 2010 to 2020

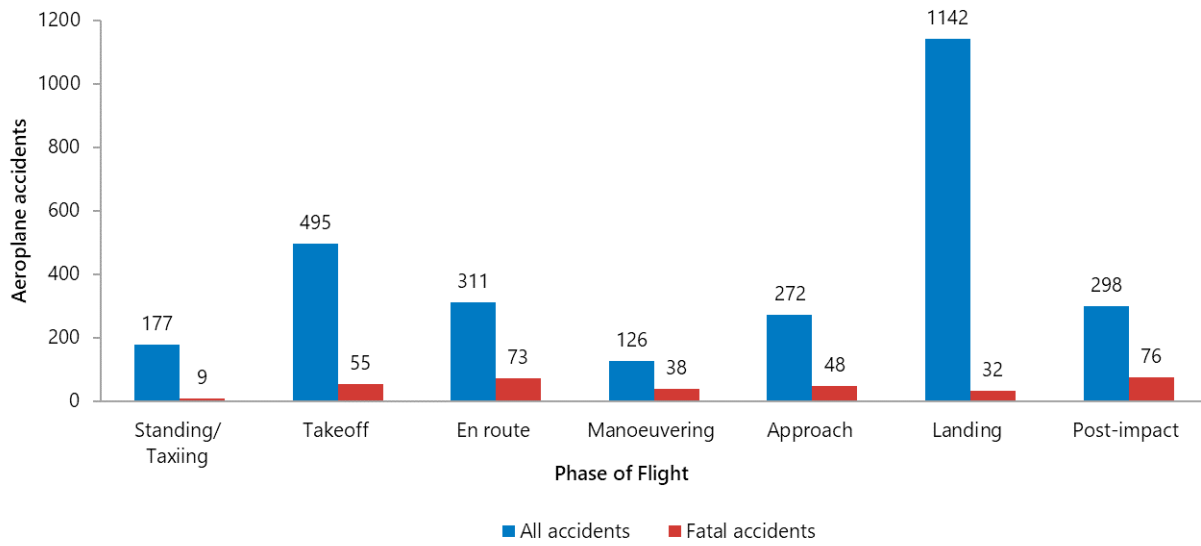
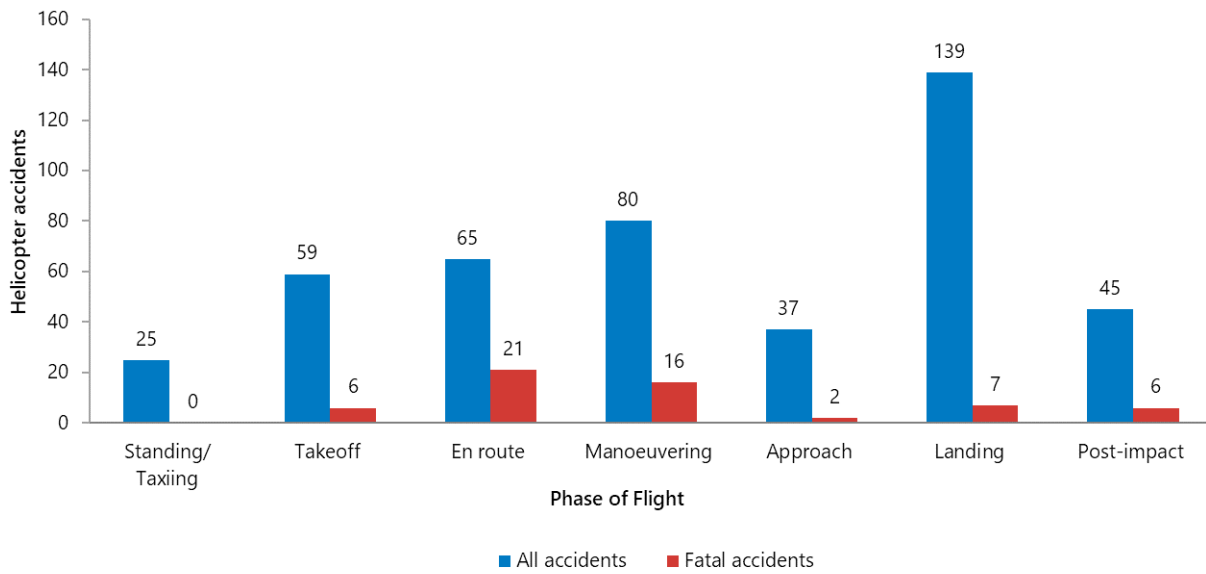


Figure 10: Helicopter accidents having events in selected phases of flight, 2010 to 2020



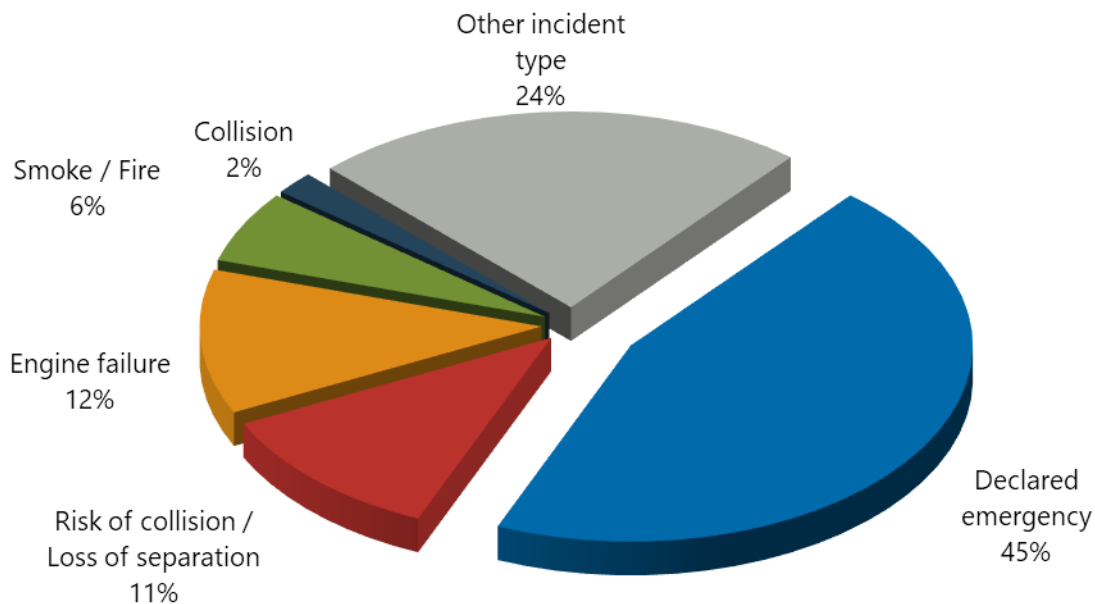
Overview of incidents

Incident counts

In 2020, 420 air transportation incidents were reported under the TSB Regulations (Table 9). This represents a decrease of 54% from the 915 that were reported in 2019, and is 47% below the average of 790 incidents per year between 2010 and 2019. The apparent increase in incidents between 2015 and 2019 is partly explained by the introduction of new 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 under an air operator certificate issued under CARs Part VII—Commercial Air Services. However, because of 2020 travel restrictions, these same commercially-operated aircraft were the most likely to be impacted by the COVID-19 pandemic, which caused general reductions in flying activity on the part of most operators. Therefore it is logical that the number of reported incidents would show a greater percentage decline compared to the number of accidents (discussed earlier).

Overall, 2020 reversed the previous trend of reported incidents gradually increasing from 2014 through 2019. While declared emergency is still the largest category of incident in 2020 (Figure 11), 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 decreased in proportion from a peak of 18% of all incidents in 2017 to just over 11% of incidents in 2020. Incidents involving engine failure remained steady in 2020 at about 12% of all incidents, as has been the case since 2015. Amongst the 24% of 'other' incident types, crew were reported to have been unable to perform their duties 34 times, or in 8% of all reportable incidents in the year. This category includes both flight crew and cabin crew.

Figure 11: Reported air transportation incidents, by type, 2020



The majority of air transportation incidents in 2020 (318) occurred in Canada and involved Canadian-registered aircraft (Table 1). However, 66 incidents involving Canadian-registered aircraft occurred outside Canada in 2020. While this count is lower than the 181 such incidents in 2019, the trend over the previous five years saw a sharp increase to a peak of 181 in 2017 and again in 2019, and contrasts with an average of 97 per year in the previous 10 years (2010 to 2019). 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. Both of these incident types, while not showing a straight-line trend over the 11-year period of this report, have increased in frequency in a statistically significant manner in the 5 years leading up to 2020. The TSB will continue to monitor these trends moving forward. The increase in reportable incidents generally 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, both of 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 93% of the incidents reported to the TSB in 2020 (Table 9). More than half (56%) of these involved Canadian-registered airliners operating under CARs Subpart 705 (airline operations). There were 219 incidents reported in 2020 involving Canadian-registered airliners, down from a peak of 614 in 2017, and 55% fewer than the average of 491 incidents per year 2010 to 2019.

Foreign air operators (CARs 701) were involved in just 32 incidents in 2020, or about 8% of all commercial incidents. This is fewer than the 86 incidents recorded in 2019, and was largely because of the reduced transborder and international passenger traffic brought about by COVID-19 restrictions.

Data tables

Table 1. Reportable air transportation occurrences, by type of occurrence, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Accidents	288	257	291	276	249	251	230	240	201	227	170
Accidents in Canada involving Canadian-registered aircraft	273	241	267	262	238	232	214	222	180	210	165
Accidents outside Canada involving Canadian-registered aircraft	1	6	8	4	4	10	8	11	11	8	5
Accidents in Canada involving foreign-registered aircraft	14	10	17	10	7	9	8	7	11	10	0
Accidents¹	288	257	291	276	249	251	230	240	201	227	170
Commercial	109	99	92	84	82	74	63	97	66	83	54
Airliner (CARs 705)	6	4	5	7	4	9	1	9	8	7	4
Commuter (CARs 704)	7	6	5	3	2	3	3	5	1	4	3
Air taxi (CARs 703)	45	38	33	33	34	23	26	28	23	26	13
Aerial work (CARs 702)	29	27	26	21	17	18	16	18	17	21	13
Foreign air operator (CARs 701)	1	2	2	2	0	0	0	4	3	1	0
Flight training units (CARs 406)	19	19	19	17	25	20	17	32	13	25	20
Other commercial	2	3	3	1	1	1	1	2	1	0	1
Private	165	149	185	179	159	172	164	142	134	143	114
Private operators (CARs 604)	2	5	3	4	3	0	5	1	5	4	2
Recreational	162	142	181	175	156	165	152	134	124	133	109
Other private	1	3	1	0	0	7	8	7	7	6	3
State	5	2	3	6	4	1	0	0	2	1	1
Other/Unknown	10	8	12	9	5	5	3	2	0	0	1
Accidents¹	288	257	291	276	249	251	230	240	201	227	170
Airplane	220	201	205	212	176	197	174	178	153	176	133
Helicopter	31	36	41	27	34	33	28	27	26	28	16
Ultralight	30	17	36	23	32	17	22	25	18	18	17
Other ²	7	3	9	15	8	7	6	10	4	6	4
Aircraft involved in accidents^{1,3}	290	261	296	280	253	259	234	247	207	230	172
Airplane	222	204	209	215	179	202	178	184	159	178	135
Helicopters	31	36	42	27	34	33	28	27	26	28	16
Ultralights	30	17	36	23	32	17	22	25	18	18	17
Other ²	7	4	9	15	8	7	6	11	4	6	4
Fatal accidents¹	37	35	42	38	14	29	29	22	23	33	12
Airplane	29	23	25	25	12	20	22	18	17	27	7
Helicopter	3	8	7	6	0	5	2	2	4	3	2
Ultralight	3	3	8	4	2	4	4	1	2	3	3
Other ²	2	1	2	4	0	0	1	1	0	1	0
Persons fatally injured in reportable accidents	72	66	63	65	21	47	45	34	38	70	16
Persons seriously injured in reportable accidents	35	49	48	22	35	31	18	33	28	31	17
Accidents in Canada involving foreign-registered aircraft	14	10	17	10	7	9	8	7	11	10	0
Fatal accidents	2	2	1	2	2	3	1	0	0	4	0
Persons fatally injured	2	2	1	2	4	4	7	0	0	11	0
Persons seriously injured	1	1	4	0	1	0	0	0	4	1	0
Occurrences with a dangerous good release	1	0	1	4	4	6	7	8	7	8	1
Incidents⁴	814	673	645	689	741	789	833	939	860	915	420
Incidents in Canada involving Canadian-registered aircraft	587	519	482	541	599	653	620	685	608	654	318
Incidents outside Canada involving Canadian-registered aircraft	78	54	48	38	55	58	117	181	161	181	66
Incidents in Canada involving foreign-registered aircraft	188	126	138	129	102	106	117	106	115	113	43
Incidents⁴	814	673	645	689	741	789	833	939	860	915	420
Risk of collision / Loss of separation	206	120	102	115	94	111	139	172	141	138	48

Declared emergency	310	275	266	294	313	333	311	348	340	366	190
Engine failure	87	95	92	83	104	110	110	98	91	103	50
Smoke/Fire	80	88	71	67	89	87	85	100	99	91	25
Collision	5	7	5	15	16	8	18	24	26	31	8
Other	126	88	109	115	125	140	170	197	163	186	99

Data extracted 9 April 2021

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, unmanned aerial vehicles (UAV) 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, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Accidents^{1,2}	244	230	239	243	212	227	200	208	173	200	153
Airplane accidents	209	192	191	204	170	190	167	171	143	168	133
Commercial	77	71	62	58	55	51	42	71	46	66	45
Airliner (CARs 705)	6	4	5	7	4	9	1	9	8	7	4
Commuter (CARs 704)	6	4	5	3	1	3	3	5	1	4	3
Air taxi (CARs 703)	29	27	19	19	19	12	16	18	18	21	10
Aerial work (CARs 702)	18	14	14	12	8	10	7	12	6	11	8
Flight training units (CARs 406)	16	19	18	16	23	16	16	27	12	23	20
Other commercial	2	3	1	1	0	1	0	0	1	0	0
Private	122	113	122	139	111	138	122	101	96	101	88
Private operators (CARs 604)	2	2	0	3	1	0	5	1	5	4	2
Recreational	119	110	121	136	110	132	114	97	90	94	83
Other private	1	2	1	0	0	6	4	3	2	3	3
State	3	2	1	2	3	1	0	0	2	1	0
Other/Unknown	8	6	6	7	2	1	3	0	0	0	0
Helicopter accidents	29	35	41	27	34	32	27	27	26	27	16
Commercial	27	26	28	22	26	23	18	22	17	16	9
Private	2	9	10	4	7	9	9	5	9	11	6
State	0	0	2	1	1	0	0	0	0	0	1
Other/Unknown	0	0	2	0	0	0	0	0	0	0	0
Other aircraft accidents ³	6	3	7	13	8	7	6	10	4	6	4
Fatal accidents^{1,2}	32	30	33	32	10	23	24	21	21	26	9
Airplane accidents	28	21	25	24	10	18	21	18	17	23	7
Commercial	12	11	6	8	2	6	3	7	4	8	1
Airliner (CARs 705)	0	1	0	0	0	0	0	1	0	0	0
Commuter (CARs 704)	1	1	1	1	0	0	0	0	0	0	0
Air taxi (CARs 703)	7	6	3	5	1	3	1	1	2	6	1
Aerial work (CARs 702)	4	2	2	1	1	2	1	2	2	1	0
Flight training units (CARs 406)	0	1	0	1	0	1	1	3	0	1	0
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	15	10	17	14	8	13	18	11	13	15	6
Private operators (CARs 604)	0	0	0	1	0	0	1	0	1	0	0
Recreational	15	10	17	13	8	13	16	10	13	15	6
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	1	0	2	2	0	0	0	0	0	0	0
Helicopter accidents	3	8	7	6	0	5	2	2	4	3	2
Commercial	3	6	5	6	0	4	1	2	1	1	1
Private	0	2	1	0	0	1	1	0	3	2	1
State	0	0	1	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	1	3	0	0	1	1	0	1	0
Persons fatally injured²	66	61	54	59	15	40	34	33	36	54	13
Persons seriously injured²	30	43	38	19	28	28	17	27	21	26	13
Incidents^{2,4}	665	573	530	579	654	711	737	866	769	835	384
Risk of collision / Loss of separation	179	106	92	105	84	101	127	159	134	128	47
Declared emergency	238	224	200	231	277	290	263	316	298	318	170
Engine failure	67	87	77	70	94	102	102	88	79	96	44
Smoke/Fire	69	67	59	55	76	79	75	95	85	83	21
Collision	4	7	4	14	15	7	16	23	21	27	8
Other	108	82	98	104	108	132	154	185	152	183	94
Accidents involving ultralight aircraft	30	17	36	23	31	16	22	25	18	18	17
Fatal accidents	3	3	8	4	2	3	4	1	2	3	3
Fatalities	4	3	8	4	2	3	4	1	2	5	3
Serious injuries	4	5	6	3	6	3	1	6	3	4	4

Data extracted 9 April 2021

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, unmanned aerial vehicles (UAV) 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, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Accidents	238	227	232	231	204	222	194	198	169	195	149
Fatal accidents	31	29	32	30	10	23	23	20	21	26	9
Fatalities	65	59	53	57	15	40	33	32	36	54	13
Hours flown ² (thousands)	3 993	4 285	4 394	4 294	4 271	4 323	4 472	4 718	5 030	4 889	2 550
Accidents per 100 000 hours	6.0	5.3	5.3	5.4	4.8	5.1	4.3	4.2	3.4	4.0	5.8
Fatal accidents per 100 000 hours	0.8	0.7	0.7	0.7	0.2	0.5	0.5	0.4	0.4	0.5	0.4
Fatalities per 100 000 hours	1.6	1.4	1.2	1.3	0.4	0.9	0.7	0.7	0.7	1.1	0.5

Data extracted 9 April 2021

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

² Hours flown in 2018 to 2020 are estimates. Source: Transport Canada, email to TSB on 2021-03-02.

Table 4. Persons fatally injured in air transportation accidents, by type of operation, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Persons fatally injured	72	66	63	65	21	47	45	34	38	70	16
In Canada, involving Canadian-registered aircraft	70	63	61	57	15	39	35	32	28	57	16
Outside Canada, involving Canadian-registered aircraft	0	1	1	6	2	4	3	2	10	2	0
In Canada, involving foreign-registered aircraft	2	2	1	2	4	4	7	0	0	11	0
Persons fatally injured	72	66	63	65	21	47	45	34	38	70	16
Commercial	36	40	18	29	4	20	6	15	9	25	2
Airliner (CARs 705)	0	12	0	0	0	0	0	1	0	0	0
Commuter (CARs 704)	1	2	1	5	0	0	0	0	0	0	0
Air taxi (CARs 703)	28	16	12	19	2	12	1	1	5	21	1
Aerial work (CARs 702)	7	8	3	4	2	6	2	7	4	3	1
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	0	2	1	1	0	2	3	5	0	1	0
Other commercial	0	0	1	0	0	0	0	1	0	0	0
Private	32	25	37	33	17	28	39	19	29	45	14
Private operators (CARs 604)	0	2	0	1	0	0	4	0	1	0	0
Recreational	32	23	37	32	17	28	27	17	29	43	14
Other private	0	0	0	0	0	0	8	2	0	2	0
State	0	0	1	0	0	0	0	0	0	0	0
Other/Unknown	4	3	7	3	0	1	0	0	0	0	0
Crew members fatally injured	40	37	40	44	15	29	25	26	20	34	11
Commercial	17	20	11	21	3	10	3	11	3	10	2
Airliner (CARs 705)	0	4	0	0	0	0	0	0	0	0	0
Commuter (CARs 704)	1	2	0	2	0	0	0	0	0	0	0
Air taxi (CARs 703)	11	7	7	14	1	4	1	1	0	8	1
Aerial work (CARs 702)	5	5	2	4	2	4	1	4	3	1	1
Foreign air operator (CARs 701)	0	0	0	0	0	0	0	0	0	0	0
Flight training units (CARs 406)	0	2	1	1	0	2	1	5	0	1	0
Other commercial	0	0	1	0	0	0	0	1	0	0	0
Private	22	16	25	21	12	20	22	15	17	24	9
Private operators (CARs 604)	0	2	0	1	0	0	1	0	1	0	0
Recreational	22	14	25	20	12	20	18	14	17	22	9
Other private	0	0	0	0	0	0	3	1	0	2	0
State	0	0	1	0	0	0	0	0	0	0	0
Other/Unknown	1	3	3	2	0	1	0	0	0	0	0
Passengers fatally injured	31	29	22	20	6	18	20	8	18	36	5
Commercial	18	20	6	8	1	10	3	4	6	15	0
Airliner (CARs 705)	0	8	0	0	0	0	0	1	0	0	0
Commuter (CARs 704)	0	0	1	3	0	0	0	0	0	0	0
Air taxi (CARs 703)	16	9	5	5	1	8	0	0	5	13	0
Aerial work (CARs 702)	2	3	0	0	0	2	1	3	1	2	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	0	0	2	0	0	0	0
Other commercial	0	0	0	0	0	0	0	0	0	0	0
Private	10	9	12	11	5	8	17	4	12	21	5
Private operators (CARs 604)	0	0	0	0	0	0	3	0	0	0	0
Recreational	10	9	12	11	5	8	9	3	12	21	5
Other private	0	0	0	0	0	0	5	1	0	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	3	0	4	1	0	0	0	0	0	0	0
Persons on the ground fatally injured	1	0	1	1	0	0	0	0	0	0	0
Persons fatally injured	72	66	63	65	21	47	45	34	38	70	16
Airplane	59	46	44	46	19	35	37	27	30	60	11
Helicopter	7	15	9	12	0	8	3	5	6	5	2
Ultralight	4	3	8	4	2	4	4	1	2	5	3
Other aircraft type	2	2	2	7	0	0	1	1	0	2	0

Data extracted 9 April 2021

Table 5. Persons seriously injured in air transportation accidents, by type of operation, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Persons seriously injured	35	49	48	22	35	31	18	33	28	31	17
In Canada, involving Canadian-registered aircraft	34	46	39	22	34	28	17	31	23	27	14
Outside Canada, involving Canadian-registered Aircraft	0	2	5	0	0	3	1	2	1	3	3
In Canada, involving foreign-registered aircraft	1	1	4	0	1	0	0	0	4	1	0
Persons seriously injured	35	49	48	22	35	31	18	33	28	31	17
Commercial	17	31	22	11	10	15	8	13	17	13	3
Airliner (CARs 705)	1	10	1	0	0	3	2	8	4	1	0
Commuter (CARs 704)	4	7	2	2	0	0	0	0	0	0	1
Air taxi (CARs 703)	6	9	15	6	5	8	4	0	9	8	0
Aerial work (CARs 702)	5	5	1	3	3	3	2	2	2	2	1
Foreign air operator (CARs 701)	0	0	1	0	0	0	0	0	1	0	0
Flight training units (CARs 406)	1	0	0	0	2	1	0	2	1	2	1
Other commercial	0	0	2	0	0	0	0	1	0	0	0
Private	16	18	26	10	23	16	10	20	11	18	13
Private operators (CARs 604)	0	0	0	0	0	0	0	0	1	0	0
Recreational	15	18	26	10	23	14	9	19	7	18	13
Other private	1	0	0	0	0	2	1	1	3	0	0
State	1	0	0	0	0	0	0	0	0	0	1
Other/Unknown	1	0	0	1	2	0	0	0	0	0	0
Crew members seriously injured	22	18	24	13	23	17	8	22	19	16	12
Commercial	8	6	6	4	5	6	3	8	10	2	2
Airliner (CARs 705)	0	0	0	0	0	1	0	3	3	0	0
Commuter (CARs 704)	1	0	2	0	0	0	0	0	0	0	0
Air taxi (CARs 703)	2	2	1	2	2	2	2	0	3	0	0
Aerial work (CARs 702)	4	4	1	2	1	3	1	2	2	1	1
Foreign air operator (CARs 701)	0	0	1	0	0	0	0	0	1	0	0
Flight training units (CARs 406)	1	0	0	0	2	0	0	2	1	1	1
Other commercial	0	0	1	0	0	0	0	1	0	0	0
Private	12	12	18	8	17	11	5	14	9	14	9
Private operators (CARs 604)	0	0	0	0	0	0	0	0	1	0	0
Recreational	11	12	18	8	17	9	5	14	6	14	9
Other private	1	0	0	0	0	2	0	0	2	0	0
State	1	0	0	0	0	0	0	0	0	0	1
Other/Unknown	1	0	0	1	1	0	0	0	0	0	0
Passengers seriously injured	12	30	23	8	11	14	8	11	9	13	4
Commercial	9	24	15	6	5	9	4	5	7	9	1
Airliner (CARs 705)	1	10	0	0	0	2	2	5	1	0	0
Commuter (CARs 704)	3	7	0	2	0	0	0	0	0	0	1
Air taxi (CARs 703)	4	7	14	4	3	6	2	0	6	7	0
Aerial work (CARs 702)	1	0	0	0	2	0	0	0	0	1	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	0	1	0	0	0	1	0
Other commercial	0	0	1	0	0	0	0	0	0	0	0
Private	3	6	8	2	5	5	4	6	2	4	3
Private operators (CARs 604)	0	0	0	0	0	0	0	0	0	0	0
Recreational	3	6	8	2	5	5	4	5	1	4	3
Other private	0	0	0	0	0	0	0	1	1	0	0
State	0	0	0	0	0	0	0	0	0	0	0
Other/Unknown	0	0	0	0	1	0	0	0	0	0	0
Persons on the ground seriously injured	1	1	1	1	1	0	2	0	0	2	1
Persons seriously injured	35	49	48	22	35	31	18	33	28	31	17
Airplane	28	36	31	13	21	23	10	23	23	26	9
Helicopter	2	8	7	6	6	5	6	3	2	1	3
Ultralight	4	5	6	3	7	3	1	6	3	4	4
Other aircraft type	1	0	4	0	1	0	1	1	0	0	1

Data extracted 9 April 2021

Table 6. Accidents involving Canadian-registered airplanes and helicopters, by type of operation,^{1,2} 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Aeroplane accidents	209	192	191	204	170	190	167	171	143	168	133
Training	28	28	27	24	27	16	20	31	14	27	23
Pleasure/Travel	108	102	109	127	96	125	112	92	83	83	74
Business	6	7	4	2	9	1	3	1	7	5	4
Forest fire management	2	1	2	3	2	2	1	0	1	2	1
Test/Demonstration/Ferry	6	4	4	4	5	2	2	4	1	3	2
Aerial application	10	4	3	7	4	5	6	6	5	6	8
Inspection	1	0	1	1	0	1	0	1	0	0	0
Air transport	37	35	28	26	22	22	16	27	26	29	15
Air ambulance	2	1	1	0	1	0	3	1	1	1	1
Sightseeing	1	2	6	1	1	1	0	1	1	2	0
Other/Unknown	9	10	8	11	4	16	5	8	6	10	5
Fatal aeroplane accidents	28	21	25	24	10	18	21	18	17	23	7
Training	1	1	1	2	1	1	1	3	0	1	1
Pleasure/Travel	15	10	16	11	7	12	15	9	12	12	5
Business	1	0	1	1	1	0	1	0	1	1	0
Forest fire management	2	0	0	0	0	1	0	0	0	0	0
Test/Demonstration/Ferry	0	0	1	1	0	0	1	0	0	1	0
Aerial application	0	0	0	1	0	0	2	1	1	0	0
Inspection	0	0	0	0	0	0	0	0	0	0	0
Air transport	7	8	4	5	1	2	1	2	2	6	1
Air ambulance	0	0	0	0	0	0	0	0	0	0	0
Sightseeing	0	1	0	0	0	1	0	0	0	0	0
Other/Unknown	2	1	3	3	0	2	0	3	2	2	0
Helicopter accidents	29	35	41	27	34	32	27	27	26	27	16
Training	0	2	1	1	2	5	1	7	1	2	0
Pleasure/Travel	2	9	8	2	7	8	9	4	6	9	6
Business	0	0	3	1	0	1	0	0	2	1	0
Forest fire management	1	2	1	3	0	2	0	2	2	1	1
Test/Demonstration/Ferry	1	1	0	1	0	0	0	0	1	0	0
Aerial application	3	1	5	0	1	2	1	3	1	3	2
Inspection	1	2	2	2	3	0	1	0	1	0	0
Air transport	15	13	9	8	18	10	7	3	3	9	2
Air ambulance	0	0	1	2	0	0	0	1	0	0	0
Sightseeing	0	0	1	0	1	0	0	1	1	0	0
Other/Unknown	6	5	10	7	2	4	8	6	8	2	5
Fatal helicopter accidents	3	8	7	6	0	5	2	2	4	3	2
Training	0	1	1	0	0	0	0	1	0	0	0
Pleasure/Travel	0	2	0	0	0	0	1	0	2	2	1
Business	0	0	1	0	0	1	0	0	0	0	0
Forest fire management	0	1	0	0	0	0	0	0	0	0	0
Test/Demonstration/Ferry	1	1	0	0	0	0	0	0	1	0	0
Aerial application	0	0	0	0	0	1	0	0	0	0	0
Inspection	0	1	0	1	0	0	0	0	0	0	0
Air transport	2	1	1	3	0	3	0	0	0	1	0
Air ambulance	0	0	0	1	0	0	0	0	0	0	0
Sightseeing	0	0	1	0	0	0	0	0	0	0	0
Other/Unknown	0	1	3	1	0	0	1	1	1	0	1

Data extracted 9 April 2021

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 aeroplane and a training aeroplane, 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, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Accidents	288	257	291	276	249	251	230	240	201	227	170
Newfoundland and Labrador	3	3	5	3	5	6	5	4	4	3	2
Prince Edward Island	0	0	0	0	0	0	0	2	0	0	0
Nova Scotia	7	5	5	5	3	6	2	3	2	1	1
New Brunswick	5	3	3	2	6	2	5	7	1	8	2
Quebec	65	58	71	66	69	51	34	44	31	50	33
Ontario	71	63	67	72	67	74	50	62	53	53	39
Manitoba	27	17	18	13	12	14	17	10	7	17	9
Saskatchewan	18	18	9	19	12	13	10	13	13	12	17
Alberta	25	22	35	29	33	23	38	35	32	29	25
British Columbia	47	43	54	51	30	42	53	39	36	38	34
Yukon	3	8	8	4	4	6	2	4	4	3	0
Northwest Territories	9	6	5	3	3	2	3	2	5	4	1
Nunavut	7	4	3	4	1	2	3	3	1	1	2
Other airspace under Canadian air traffic control	0	1	0	1	0	0	0	1	1	0	0
Outside Canada	1	6	8	4	4	10	8	11	11	8	5
Fatal accidents	37	35	42	38	14	29	29	22	23	33	12
Newfoundland and Labrador	1	0	0	0	0	1	0	0	0	2	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	1	0	1	1	1	0	0	0	0	0
New Brunswick	2	0	0	0	1	0	1	0	0	1	0
Quebec	10	5	10	5	2	7	7	4	2	9	4
Ontario	9	6	10	9	5	6	5	4	6	6	1
Manitoba	1	1	3	2	0	1	1	3	0	1	0
Saskatchewan	0	3	1	2	1	2	2	2	1	0	0
Alberta	2	4	6	4	1	3	4	3	5	5	3
British Columbia	7	10	9	10	2	4	8	3	4	5	3
Yukon	0	1	1	0	0	0	0	1	0	2	0
Northwest Territories	3	2	0	1	0	0	0	0	1	1	0
Nunavut	1	1	1	0	0	0	0	0	0	0	0
Other airspace under Canadian air traffic control	0	0	0	1	0	0	0	0	0	0	0
Outside Canada	0	1	1	3	1	4	1	2	4	1	0
Persons fatally injured	72	66	63	65	21	47	45	34	38	70	16
Newfoundland and Labrador	2	0	0	0	0	1	0	0	0	8	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	2	1	0	1	1	1	0	0	0	0	0
New Brunswick	2	0	0	0	2	0	2	0	0	1	0
Quebec	28	9	11	5	2	16	15	6	4	14	5
Ontario	14	9	19	19	8	10	5	9	8	16	1
Manitoba	1	1	4	5	0	1	2	4	0	3	0
Saskatchewan	0	7	5	3	2	3	2	3	1	0	0
Alberta	4	5	6	5	1	4	4	5	6	8	6
British Columbia	15	16	15	17	3	7	12	4	6	12	3
Yukon	0	1	1	0	0	0	0	1	0	4	0
Northwest Territories	3	4	0	1	0	0	0	0	3	2	0
Nunavut	1	12	1	0	0	0	0	0	0	0	0
Other airspace under Canadian air traffic control	0	0	0	3	0	0	0	0	0	0	0
Outside Canada	0	1	1	6	2	4	3	2	10	2	0

Data extracted 9 April 2021

Table 8. Accidents and fatal accidents in Canada and outside Canada involving Canadian-registered aircraft,¹ 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Accidents	244	230	239	243	212	227	200	208	173	200	153
Newfoundland and Labrador	3	3	5	3	4	6	4	3	2	2	2
Prince Edward Island	0	0	0	0	0	0	0	1	0	0	0
Nova Scotia	7	3	3	5	2	5	2	2	1	1	1
New Brunswick	4	3	3	2	6	2	5	5	1	8	2
Quebec	52	52	52	57	57	44	28	39	28	41	29
Ontario	55	56	54	59	53	66	43	51	44	46	32
Manitoba	25	16	15	13	11	13	17	10	7	12	9
Saskatchewan	18	17	8	18	10	12	10	12	13	12	16
Alberta	24	18	30	27	31	21	36	30	27	27	23
British Columbia	38	39	46	44	27	39	43	35	30	36	32
Yukon	3	7	7	4	4	6	1	4	2	2	0
Northwest Territories	8	6	5	3	2	2	3	2	5	4	1
Nunavut	6	3	3	3	1	1	2	3	1	1	2
Other airspace under Canadian air traffic control	0	1	0	1	0	0	0	0	1	0	0
Outside Canada	1	6	8	4	4	10	6	11	11	8	4
Fatal accidents	32	30	33	32	10	23	24	21	21	26	9
Newfoundland and Labrador	1	0	0	0	0	1	0	0	0	1	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	1	0	0	1	0	0	0	0	0	0	0
New Brunswick	2	0	0	0	1	0	1	0	0	1	0
Quebec	9	5	4	3	1	6	5	4	2	5	3
Ontario	8	4	9	6	3	5	3	4	5	5	0
Manitoba	1	1	3	2	0	0	1	3	0	1	0
Saskatchewan	0	3	1	2	1	2	2	2	1	0	0
Alberta	2	3	5	4	1	3	4	3	4	5	2
British Columbia	5	9	8	9	2	2	7	2	4	5	3
Yukon	0	1	1	0	0	0	0	1	0	1	0
Northwest Territories	2	2	0	1	0	0	0	0	1	1	0
Nunavut	1	1	1	0	0	0	0	0	0	0	0
Other airspace under Canadian air traffic control	0	0	0	1	0	0	0	0	0	0	0
Outside Canada	0	1	1	3	1	4	1	2	4	1	0
Persons fatally injured	66	61	54	59	15	40	34	33	36	54	13
Newfoundland and Labrador	2	0	0	0	0	1	0	0	0	7	1
Prince Edward Island	0	0	0	0	0	0	0	0	0	0	0
Nova Scotia	2	0	0	1	0	0	0	0	0	0	0
New Brunswick	2	0	0	0	2	0	2	0	0	1	0
Quebec	27	9	5	3	1	15	7	6	4	8	4
Ontario	12	7	18	16	4	9	3	9	7	9	0
Manitoba	1	1	4	5	0	0	2	4	0	3	0
Saskatchewan	0	7	5	3	2	3	2	3	1	0	0
Alberta	4	4	5	5	1	4	4	5	5	8	5
British Columbia	13	15	14	16	3	4	11	3	6	12	3
Yukon	0	1	1	0	0	0	0	1	0	2	0
Northwest Territories	2	4	0	1	0	0	0	0	3	2	0
Nunavut	1	12	1	0	0	0	0	0	0	0	0
Other airspace under Canadian air traffic control	0	0	0	3	0	0	0	0	0	0	0
Outside Canada	0	1	1	6	2	4	3	2	10	2	0

Data extracted 9 April 2021

Table 9. Reportable aircraft incidents, by type of operation,¹ 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Incidents¹	814	673	645	689	741	789	833	939	860	915	420
Risk of collision / Loss of separation	206	120	102	115	94	111	139	172	141	138	48
Declared emergency	310	275	266	294	313	333	311	348	340	366	190
Engine failure	87	95	92	83	104	110	110	98	91	103	50
Smoke/Fire	80	88	71	67	89	87	85	100	99	91	25
Collision	5	7	5	15	16	8	18	24	26	31	8
Control difficulties	32	31	33	25	40	29	35	34	41	25	25
Crew unable to perform duties	51	26	40	58	37	46	66	78	57	87	34
Dangerous goods-related	1	0	1	3	4	0	2	0	2	0	0
Depressurization	11	16	15	14	12	16	14	21	13	23	5
Fuel shortage	9	6	7	2	6	17	15	17	10	5	3
Failure to remain in landing area	12	7	10	9	20	17	19	22	11	9	10
Incorrect fuel	0	0	0	0	0	0	1	3	0	3	4
Slung load released	9	1	1	4	5	14	15	21	23	28	11
Transmission or gearbox failure	1	1	2	0	1	1	3	1	0	1	0
Incidents^{1,2}	814	673	645	689	741	789	833	939	860	915	420
Commercial	781	637	609	656	699	741	785	888	815	869	392
Airliner (CARs 705)	520	446	409	450	429	437	490	614	547	572	219
Commuter (CARs 704)	87	76	83	95	106	87	79	73	60	67	50
Air taxi (CARs 703)	28	28	22	30	79	114	104	102	90	104	59
Aerial work (CARs 702)	28	15	11	12	34	48	43	55	55	59	35
Foreign air operator (CARs 701)	170	109	117	113	82	75	94	80	91	86	32
Flight training units (CARs 406)	9	4	3	4	5	6	12	11	7	13	6
Other commercial	3	2	1	1	0	2	5	1	2	4	2
Private	34	39	35	31	37	52	45	56	51	56	27
Private operators (CARs 604)	15	19	20	18	22	19	20	32	19	26	12
Recreational	19	20	15	13	14	15	13	11	9	9	6
Other private	0	1	0	0	1	18	12	13	23	22	10
State	23	13	20	20	13	15	8	15	11	8	5
Other/Unknown	6	5	4	4	12	15	22	13	12	12	2
Incidents^{1,2}	814	673	645	689	741	789	833	939	860	915	420
Aeroplane	789	655	633	673	715	749	795	892	819	842	399
Helicopter	32	20	17	20	30	47	38	52	43	77	21
Ultralight/Other aircraft type ³	2	0	0	0	3	8	7	4	4	6	0
Aircraft involved in incidents^{1,4}	977	776	742	800	830	887	957	1063	970	1016	450
Aeroplanes	943	756	725	780	797	832	912	1006	921	931	429
Helicopters	32	20	17	20	30	47	38	53	45	79	21
Ultralight / Other aircraft type ³	2	0	0	0	3	8	7	4	4	6	0
Incidents¹	814	673	645	689	741	789	833	939	860	915	420
Newfoundland and Labrador	30	14	17	29	22	30	31	27	35	29	11
Prince Edward Island	0	1	0	2	0	1	4	1	2	1	1
Nova Scotia	25	19	17	11	22	19	17	22	28	28	13
New Brunswick	10	7	7	7	8	9	9	4	7	11	3
Quebec	108	126	107	122	89	116	109	139	141	147	75
Ontario	176	174	155	166	157	152	166	230	144	166	88
Manitoba	51	31	31	31	51	54	47	49	43	44	26
Saskatchewan	19	11	18	27	32	21	25	19	16	24	15
Alberta	84	82	81	103	98	117	110	107	104	106	43
British Columbia	156	76	101	99	132	154	137	101	123	129	56
Yukon	4	3	4	5	6	6	5	5	2	8	1
Northwest Territories	21	30	17	16	25	17	9	20	22	9	11
Nunavut	21	19	19	10	20	15	15	15	19	15	4
Other airspace under Canadian air traffic control	31	27	23	23	24	20	32	19	14	17	7
Outside Canada	78	54	48	38	55	58	117	181	161	181	66

Data extracted 9 April 2021

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, unmanned aerial vehicles (UAV) 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, 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Incidents¹	665	573	530	579	654	711	737	866	769	835	384
Risk of collision / Loss of separation	179	106	92	105	84	101	127	159	134	128	47
Declared emergency	238	224	200	231	277	290	263	316	298	318	170
Engine failure	67	87	77	70	94	102	102	88	79	96	44
Smoke/Fire	69	67	59	55	76	79	75	95	85	83	21
Collision	4	7	4	14	15	7	16	23	21	27	8
Control difficulties	24	27	31	22	36	28	30	33	40	25	24
Crew unable to perform duties	50	26	38	56	35	44	65	74	55	86	30
Dangerous goods-related	1	0	1	3	3	0	2	0	2	0	0
Depressurization	10	15	13	10	10	14	13	19	11	23	5
Fuel shortage	6	5	4	2	3	15	11	16	5	4	3
Failure to remain in landing area	7	7	9	7	17	17	14	18	10	8	10
Incorrect fuel	0	0	0	0	0	0	1	3	0	3	4
Slung load released	9	1	1	4	4	13	15	21	23	28	11
Transmission or gearbox failure	1	1	1	0	0	1	3	1	0	1	0
Incidents by operator type^{1,2}	665	573	530	579	654	711	737	866	769	835	384
Commercial	641	547	504	552	622	674	705	825	741	799	362
Airliner (CARs 705)	519	443	409	449	427	436	489	613	546	571	217
Commuter (CARs 704)	87	76	83	95	106	87	79	73	60	67	50
Air taxi (CARs 703)	28	28	21	30	79	114	104	102	90	104	58
Aerial work (CARs 702)	28	15	11	12	31	47	43	55	55	59	35
Flight training units (CARs 406)	9	4	3	4	5	6	12	11	7	13	6
Other commercial	2	0	0	0	0	1	2	0	1	3	1
Private	29	29	28	25	29	40	37	48	33	45	22
Private operators (CARs 604)	12	11	14	13	17	16	20	32	19	25	12
Recreational	17	18	14	12	11	14	11	11	8	9	6
Other private	0	1	0	0	1	10	6	5	6	12	5
State	19	13	17	19	11	15	6	13	10	8	5
Other/Unknown	5	3	2	4	9	14	14	10	12	10	1
Incidents^{1,2}	665	573	530	579	654	711	737	866	769	835	384
Airplane	642	555	519	563	631	672	699	819	728	762	363
Helicopter	31	20	16	20	27	46	38	52	43	77	21
Ultralight / Other aircraft type ³	1	0	0	0	3	8	6	4	4	6	0
Aircraft involved in incidents^{1,4}	811	667	619	681	730	800	843	981	874	927	413
Airplanes	779	647	603	661	700	746	799	924	825	842	392
Helicopters	31	20	16	20	27	46	38	53	45	79	21
Ultralight / Other aircraft type ³	1	0	0	0	3	8	6	4	4	6	0
Incidents by province/territory¹	665	573	530	579	654	711	737	866	769	835	384
Newfoundland and Labrador	13	10	10	17	13	20	22	22	22	15	8
Prince Edward Island	0	0	0	1	0	1	4	1	2	1	1
Nova Scotia	19	14	9	9	19	17	12	17	20	26	11
New Brunswick	8	5	7	4	6	9	9	3	6	8	2
Quebec	89	104	84	96	81	103	99	127	122	125	68
Ontario	141	146	127	142	139	141	148	202	129	146	84
Manitoba	45	30	30	27	45	51	44	47	38	44	25
Saskatchewan	15	11	14	26	27	19	25	18	14	24	13
Alberta	74	76	75	93	93	110	103	102	97	100	38
British Columbia	134	68	87	93	125	137	118	100	114	124	52
Yukon	3	3	3	3	5	6	5	3	2	8	1
Northwest Territories	19	30	17	16	25	17	8	20	21	8	10
Nunavut	17	16	15	10	16	14	15	14	16	14	3
Other airspace under Canadian air traffic control	10	6	4	4	5	8	8	9	5	11	2
Outside Canada	78	54	48	38	55	58	117	181	161	181	66

Data extracted 9 April 2021

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, unmanned aerial vehicles (UAV) 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 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Standing/Taxiing	17	18	17	23	16	19	16	20	13	14	4	177
Collision with object	6	6	7	8	6	3	5	9	6	5	1	62
Collision with moving aircraft	1	1	2	1	3	5	4	3	3	2	1	26
Nosedown/Overturned	4	3	3	5	1	3	2	2	0	1	0	24
Landing gear collapse/retracted	2	3	0	2	1	2	1	3	1	2	0	17
Loss of control	3	0	3	4	1	0	0	0	0	0	0	11
Other events	8	9	9	11	9	12	13	14	10	10	3	108
Takeoff	54	41	54	40	48	53	47	45	35	48	30	495
Collision with terrain	15	11	21	11	10	18	13	15	7	14	4	139
Loss of control	15	12	17	7	18	9	11	7	5	11	3	115
Collision with object	13	9	17	8	11	18	12	8	11	17	12	136
Takeoff/landing event	13	13	19	9	11	11	14	16	11	11	8	136
Power loss	14	11	6	13	16	12	10	11	5	12	6	116
Other events	35	28	33	26	34	50	30	35	31	38	28	368
En route	32	31	30	34	23	29	19	34	27	28	24	311
Power loss	13	14	15	15	14	8	12	15	11	12	8	137
Precautionary/forced landing / Ditching	11	13	9	8	7	5	4	5	6	8	4	80
Collision with terrain	8	8	7	10	5	4	5	5	5	6	3	66
Component/system related	4	1	2	3	2	3	0	3	1	2	3	24
Other events	20	18	14	18	14	26	8	24	22	21	19	204
Manoeuvring	11	12	11	12	4	11	13	11	12	15	14	126
Collision with terrain	5	6	8	7	1	7	6	7	4	5	6	62
Loss of control	3	1	4	1	1	2	4	5	4	0	3	28
Collision with object	7	1	1	2	1	2	3	1	2	5	3	28
Power loss	1	3	1	0	0	1	2	1	1	1	2	13
Other events	3	9	2	5	3	4	6	2	8	12	7	61
Approach	29	23	21	32	28	25	17	21	25	27	24	272
Collision with terrain	11	7	6	6	7	10	4	7	5	8	1	72
Power loss	7	2	0	11	6	2	3	6	6	5	6	54
Collision with object	6	8	1	7	9	7	6	7	3	2	5	61
Component/system related	2	5	3	3	4	2	0	2	3	3	2	29
Precautionary/forced landing / Ditching	5	2	2	7	7	1	1	4	5	7	4	45
Loss of control	6	3	4	5	1	4	1	0	1	5	0	30
Other events	9	8	14	10	9	18	12	13	18	21	18	150
Landing	112	113	111	116	99	118	113	95	92	93	80	1142
Missed or went off runway	24	27	26	28	14	30	30	21	17	23	20	260
Collision with object	25	28	26	18	20	29	24	23	29	25	18	265
Landing gear collapsed/retracted	26	24	22	25	17	27	27	23	19	17	18	245
Nosedown/Overturned	18	17	20	20	17	27	33	29	23	21	19	244
Loss of control	20	17	27	19	22	2	3	6	3	4	0	123
Hard landing	23	22	20	13	14	10	17	19	16	17	7	178
Collision with terrain	18	16	18	12	21	20	12	7	11	10	8	153
Wheels-up landing	7	3	7	10	7	10	9	4	5	7	1	70
Precautionary/forced landing / Ditching	5	3	9	11	5	12	18	18	7	7	9	104
Other events	46	49	42	45	28	77	77	50	58	53	53	578
Post-impact	20	11	19	13	16	37	57	41	44	31	9	298
Fire/Explosion/Fumes	15	6	7	7	6	13	9	5	7	5	4	84
Other events	5	5	12	6	12	24	49	37	38	26	5	219

Data extracted 9 April 2021

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 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Standing/Taxiing	0	6	4	1	4	2	0	1	4	3	0	25
Collision with terrain	0	2	1	0	0	1	0	0	0	0	0	4
Loss of control	0	2	0	0	2	1	0	0	0	2	0	7
Collision with object	0	0	0	0	2	1	0	1	1	1	0	6
Other events	0	5	4	1	4	0	0	0	4	2	0	20
Takeoff	2	7	7	7	9	4	6	5	5	6	1	59
Loss of control	1	4	2	0	5	1	4	4	1	3	0	25
Collision with terrain	2	3	1	2	1	2	1	1	2	2	0	17
Collision with object	1	0	4	2	2	1	0	1	2	3	0	16
Power loss	0	2	0	1	1	0	1	0	0	0	0	5
Other events	1	1	2	2	4	1	3	2	2	4	1	23
En route	7	10	9	5	7	4	5	3	6	4	5	65
Collision with terrain	3	3	3	1	3	1	1	1	2	2	1	21
Power loss	3	2	3	1	1	1	3	0	1	1	1	17
Precautionary/forced landing / Ditching	1	0	1	1	0	1	0	0	0	0	0	4
Component/system related	0	2	0	1	0	1	0	0	0	1	0	5
Other events	4	7	6	4	5	3	4	3	5	1	5	47
Manoeuvring	6	10	11	8	4	8	8	7	4	9	5	80
Collision with terrain	3	6	5	5	2	3	5	3	2	2	2	38
Loss of control	2	2	3	2	2	2	3	4	0	2	2	24
Collision with object	2	3	3	2	1	1	3	3	1	4	1	24
Operations related event	1	2	2	1	0	2	5	3	1	6	1	24
Power loss	1	0	2	1	0	2	1	1	0	1	0	9
Other events	1	3	6	2	2	5	5	5	2	7	4	42
Approach	4	6	7	3	3	3	5	2	2	1	1	37
Collision with terrain	4	1	1	0	0	0	1	0	0	0	0	7
Power loss	0	0	2	0	1	1	3	0	0	0	0	7
Loss of control	1	1	1	0	1	1	2	1	1	0	0	9
Collision with object	0	2	0	0	1	0	1	1	0	0	0	5
Other events	3	3	5	3	2	2	4	1	1	1	1	26
Landing	15	7	13	12	12	18	16	13	12	12	9	139
Hard landing	4	4	4	1	3	1	0	1	2	0	0	20
Collision with terrain	4	2	4	0	3	6	0	0	2	1	1	23
Loss of control	1	1	1	2	4	6	2	1	2	3	6	29
Collision with object	5	2	2	5	5	1	4	3	6	2	5	40
Other events	7	2	4	9	5	10	4	5	5	7	5	63
Post-impact	4	4	2	3	2	5	11	1	6	5	2	45
Fire/Explosion/Fumes	1	2	1	2	0	1	0	0	0	3	2	12
Other events	3	2	1	1	2	4	11	1	6	4	0	35

Data extracted 9 April 2021

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 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Standing/Taxiing	0	1	1	1	0	1	2	1	0	1	1	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	0	1	1	1	0	1	2	1	0	1	1	9
Takeoff	6	4	6	4	2	9	5	6	5	7	1	55
Collision with terrain	2	1	4	3	0	4	4	5	2	5	0	30
Loss of control	1	2	2	2	1	4	4	2	2	2	0	22
Collision with object	0	1	2	0	0	1	0	1	1	1	0	7
Takeoff/landing event	0	1	1	1	1	0	0	1	0	0	1	6
Power loss	3	1	0	0	1	1	1	1	0	1	0	9
Other events	3	4	3	2	0	7	1	4	4	3	1	32
En route	9	9	8	9	3	7	5	5	6	10	2	73
Power loss	0	2	1	0	0	0	2	0	1	2	0	8
Precautionary/forced landing / Ditching	0	1	0	0	0	0	1	0	0	1	0	3
Collision with terrain	8	5	6	7	3	4	4	3	5	6	1	52
Component/system related	1	0	0	0	0	1	0	0	0	0	0	2
Other events	4	4	2	5	1	6	2	4	5	7	1	41
Manoeuvring	2	1	4	3	2	4	5	4	5	4	4	38
Collision with terrain	1	1	4	2	1	4	4	4	3	4	3	31
Loss of control	1	0	2	0	1	0	2	2	4	0	1	13
Collision with object	2	0	0	0	0	1	1	1	0	0	1	6
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Other events	1	1	0	1	1	0	1	1	3	2	1	12
Approach	10	6	5	5	1	5	4	4	4	4	0	48
Collision with terrain	6	4	3	5	0	3	3	3	2	2	0	31
Power loss	1	1	0	1	0	0	0	0	0	0	0	3
Collision with object	2	2	0	0	0	1	1	1	0	0	0	7
Component/system related	0	0	0	0	0	0	0	1	0	2	0	3
Precautionary/forced landing / Ditching	2	1	0	0	0	0	0	0	0	0	0	3
Loss of control	5	0	1	2	0	0	1	0	0	1	0	10
Other events	4	1	4	1	1	2	2	2	2	3	0	22
Landing	3	5	3	3	4	4	5	0	1	4	0	32
Missed or went off runway	0	0	0	0	1	0	1	0	0	0	0	2
Collision with object	0	1	0	0	0	1	1	0	1	2	0	6
Landing gear collapsed/retracted	0	0	0	0	0	0	0	0	0	0	0	0
Nosedown/Overturned	1	1	1	2	1	0	0	0	1	2	0	9
Loss of control	1	0	0	1	0	0	0	0	0	0	0	2
Hard landing	0	0	1	0	0	0	0	0	0	0	0	1
Collision with terrain	2	2	3	2	2	2	4	0	0	1	0	18
Wheels-up landing	0	0	0	0	0	0	0	0	0	0	0	0
Precautionary/forced landing / Ditching	0	0	0	1	0	1	0	0	0	0	0	2
Other events	1	1	2	0	2	1	3	0	1	2	0	13
Post-impact	13	6	8	8	4	10	9	5	8	4	1	76
Fire/Explosion/Fumes	12	4	6	7	3	10	7	4	6	3	1	63
Other events	1	2	2	1	2	0	2	1	2	1	0	14

Data extracted 9 April 2021

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 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	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	2	0	1	0	0	0	0	1	6
Loss of control	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	0	1	0	1	0	1	0	0	0	0	0	3
Collision with object	0	0	0	1	0	1	0	0	0	0	0	2
Power loss	0	1	0	0	0	0	0	0	0	0	0	1
Other events	0	0	0	0	0	0	0	0	0	0	1	1
En route	3	2	3	2	0	2	1	1	4	3	0	21
Collision with terrain	3	2	2	1	0	1	1	0	2	2	0	14
Power loss	0	0	0	0	0	0	0	0	0	1	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	0	1	0	1
Other events	2	1	2	2	0	1	1	1	3	0	0	13
Manoeuvring	0	4	3	2	0	1	1	1	1	1	2	16
Collision with terrain	0	3	1	2	0	1	0	1	1	0	1	10
Loss of control	0	0	1	1	0	0	0	1	0	0	1	4
Collision with object	0	1	0	0	0	0	1	1	0	0	0	3
Operations related event	0	0	2	0	0	0	0	1	0	1	1	5
Power loss	0	0	1	0	0	1	0	0	0	0	0	2
Other events	0	2	2	0	0	0	1	1	0	1	1	8
Approach	0	1	1	0	0	0	0	0	0	0	0	2
Collision with terrain	0	0	0	0	0	0	0	0	0	0	0	0
Power loss	0	0	0	0	0	0	0	0	0	0	0	0
Loss of control	0	1	1	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	0	1	0	0	0	0	0	0	0	0	1
Landing	0	1	2	0	0	2	0	1	0	1	0	7
Hard landing	0	0	0	0	0	0	0	0	0	0	0	0
Collision with terrain	0	1	2	0	0	1	0	0	0	0	0	4
Loss of control	0	0	0	0	0	1	0	0	0	0	0	1
Collision with object	1	0	0	0	0	0	1	0	2	0	0	4
Other events	0	0	0	0	0	0	0	0	0	1	0	1
Post-impact	0	1	1	2	0	1	0	0	0	0	1	6
Fire/Explosion/Fumes	0	1	1	1	0	1	0	0	0	0	1	5
Other events	0	0	0	1	0	0	0	0	0	0	0	1

Data extracted 9 April 2021

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.