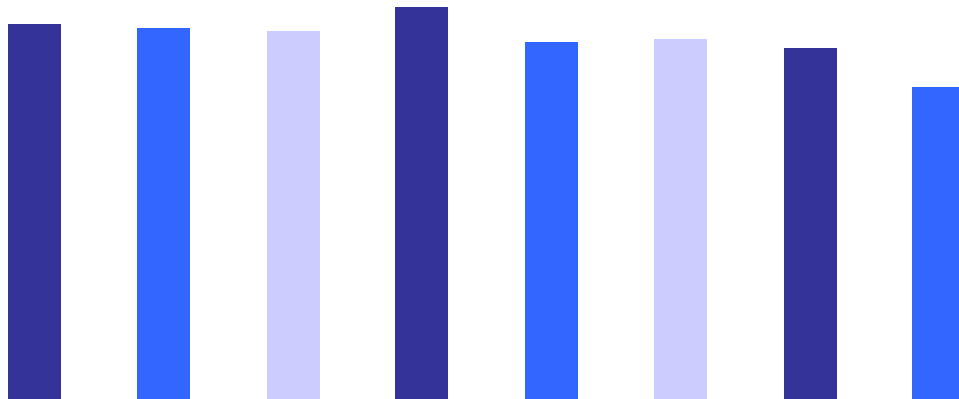




## Statistical Summary Aviation Occurrences 2011



## Foreword

This document provides users of Canadian aviation safety data with an annual summary of selected statistics on aviation occurrences. Information in this summary is also posted on the Transportation Safety Board of Canada (TSB) web site at [www.bst-tsb.gc.ca](http://www.bst-tsb.gc.ca).

Users of these statistics are advised that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics can change slightly over time. Further, as many occurrences are not formally investigated, information recorded on some occurrences may not have been verified. Therefore, caution should be used when utilizing these statistics. The 2011 statistics presented here reflect the TSB database updated as of 15 February 2012.

To enhance awareness and increase the safety value of the material presented in the TSB *Statistical Summary, Aviation Occurrences 2011*, readers are encouraged to copy or reprint the data presented, in whole or in part, for further distribution (with acknowledgements of the source).

The TSB is an independent agency operating under its own Act of Parliament. Its sole aim is the advancement of transportation safety.

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# AVIATION OCCURRENCES IN 2011

## ACCIDENTS

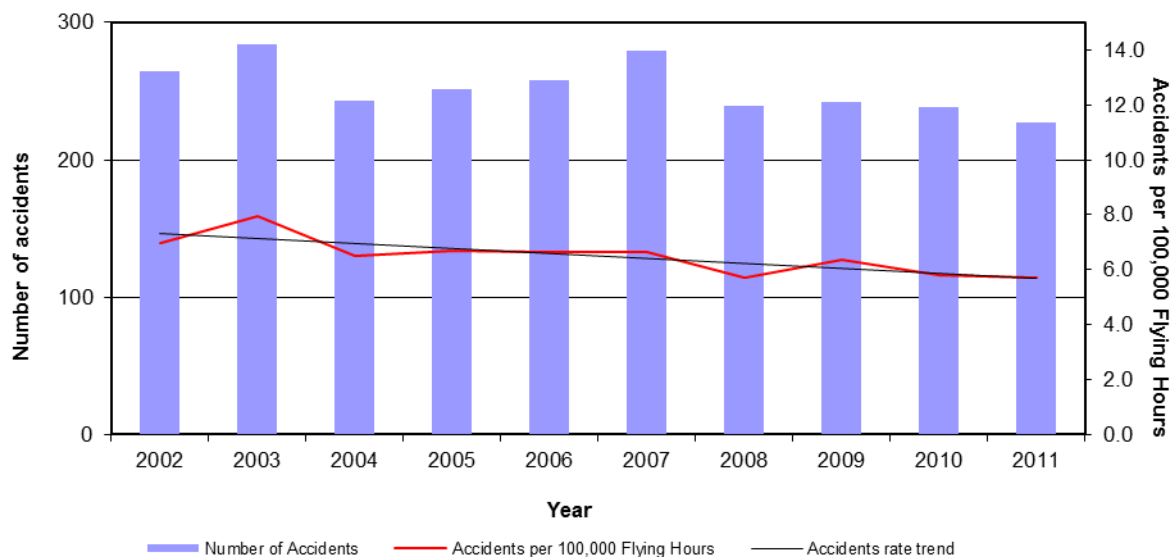
### *Overview of Accidents and Fatalities (Tables 1, 2, 3a, 3b and 6)*

In 2011, a total of 257 aviation accidents were reported to the TSB. Of this number, 230 involved Canadian-registered aircraft (excluding ultralights), a 6% decrease from 2010 (Figure 1).

The 2011 estimate of flying activity is 3,966,000 hours, and the accident rate for Canadian-registered aircraft decreased from the 2010 accident rate of 5.8 accidents per 100 000 flying hours to 5.7. Statistical analysis using linear regression indicates a significant downward trend in accident rates ( $p < .01$ )<sup>1</sup> over the past 10 years.

The 230 accidents involving Canadian-registered aircraft (excluding ultralights) included 192 accidents involving aeroplanes<sup>2</sup> (49 accidents involved commercially operated aeroplanes) and 35 accidents involving helicopters. The remaining 3 accidents involved balloons, gliders or gyrocopters.

**Figure 1 – Accidents and Accident Rates,<sup>3</sup> 2002–2011**



<sup>1</sup> It is agreed by convention that, for a result to be considered statistically significant, its probability must be lower than 1 in 20 (that is,  $p < .05$ ).

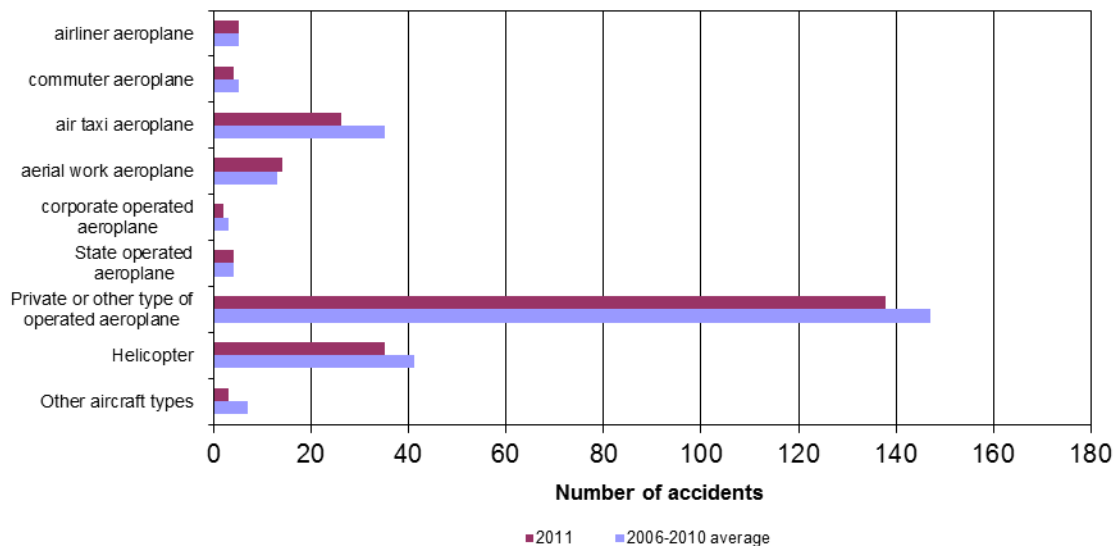
<sup>2</sup> As some occurrences involve more than one aircraft, users are cautioned to note differences between the number of occurrences and the number of aircraft involved in occurrences. All tables except Table 1 exclude ultralight aircraft; all tables except Tables 1 and 4 also exclude balloons, gliders and gyrocopters.

<sup>3</sup> Canadian-registered aircraft (excluding ultralights).

Of the 49 accidents involving commercial aeroplanes (5 airliners, 4 commuter aircraft, 26 air taxi and 14 aerial work) in 2011 (Figure 2), 6 fatal accidents involved air taxi aircraft, 2 fatal accidents involved aerial work, one fatal accident involved a commuter aircraft, and one fatal accident involved an airliner.

A total of 138 accidents involved private/other aeroplanes, 6% lower than the five-year average of 147. In 2011, 11 such accidents resulted in fatalities, down from 2010, and down four from the five-year average.

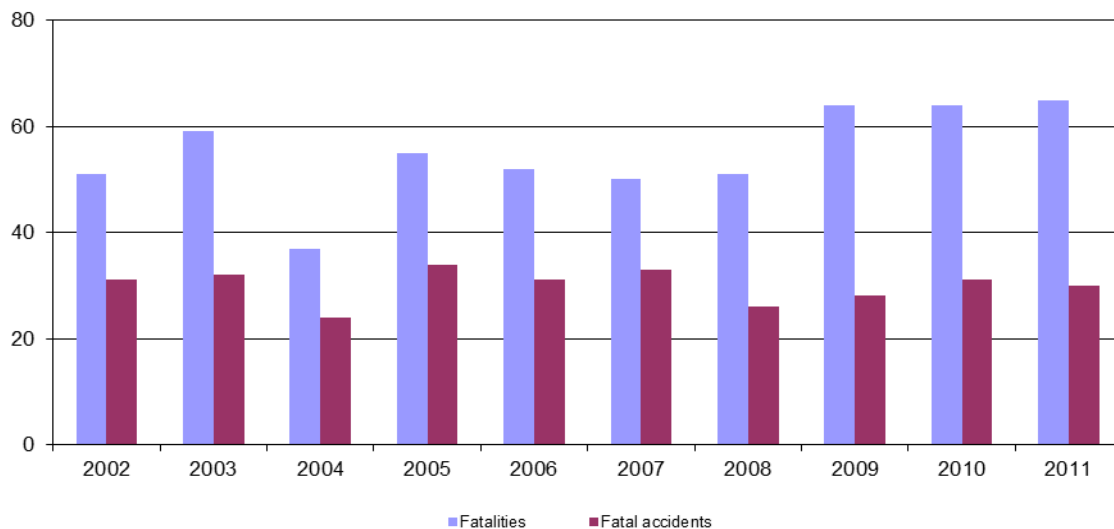
**Figure 2—Accidents Involving Canadian-Registered Aircraft, by Aircraft Type, 2011**



In 2011, 30 fatal accidents involved Canadian-registered aircraft other than ultralights (Figure 3), slightly lower than last year's total of 31 but the same as the 2006–2010 average of 30. The number of fatalities (65) was higher than the five-year average (56), and the number of serious injuries (37) decreased from the five-year average (40).

In 2011, for all reportable accidents, crew fatalities accounted for 53% of aircraft fatalities, passenger fatalities accounted for 41%, and ground fatalities accounted for 6%.

**Figure 3—Fatalities and Fatal Accidents, 2002–2011**



Two accidents involved aeroplanes operated by the state (that is, operated by federal or provincial governments) in 2011, with no fatalities.

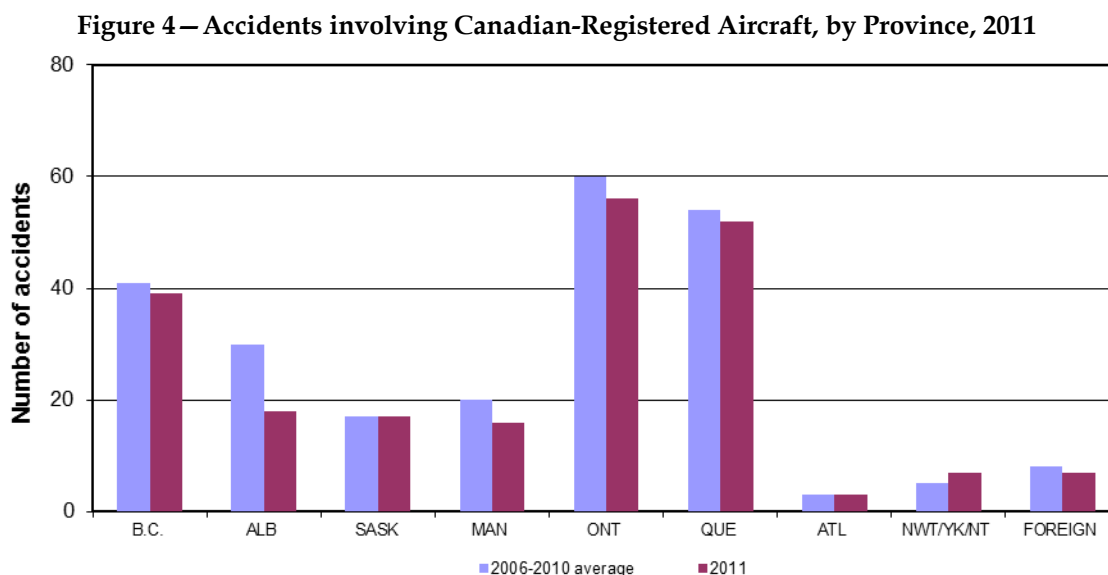
In 2011, 35 accidents involved helicopters, yielding a 15% decrease from the five-year average of 41. Eight of those accidents were fatal, resulting in 18 fatalities. Over the past 10 years, the highest proportion of helicopter accidents occurred during air transport operations (38%), pleasure/travel (12%), and training (9%).

In 2011, 17 accidents in Canada involved ultralight aircraft, a 43% decrease from the five-year average of 30. Three of these were fatal accidents resulting in 3 fatalities.

In 2011, 10 accidents involved foreign-registered aircraft in Canada, with 2 fatal accidents resulting in 2 fatalities.

### *Accidents by Selected Categories*

**Province (Table 8):** In 2011, Ontario and Quebec accounted for 24% and 23% respectively of Canadian-registered aircraft accidents, while British Columbia accounted for 17%. Canadian-registered aircraft accidents were lower than the five-year average in most provinces except for Saskatchewan, which had the same number of accidents in 2011 as the five-year average and the Yukon which was higher than the five year average (Figure 4).



### **Accident Events and Phases (Tables 11 and 12):**

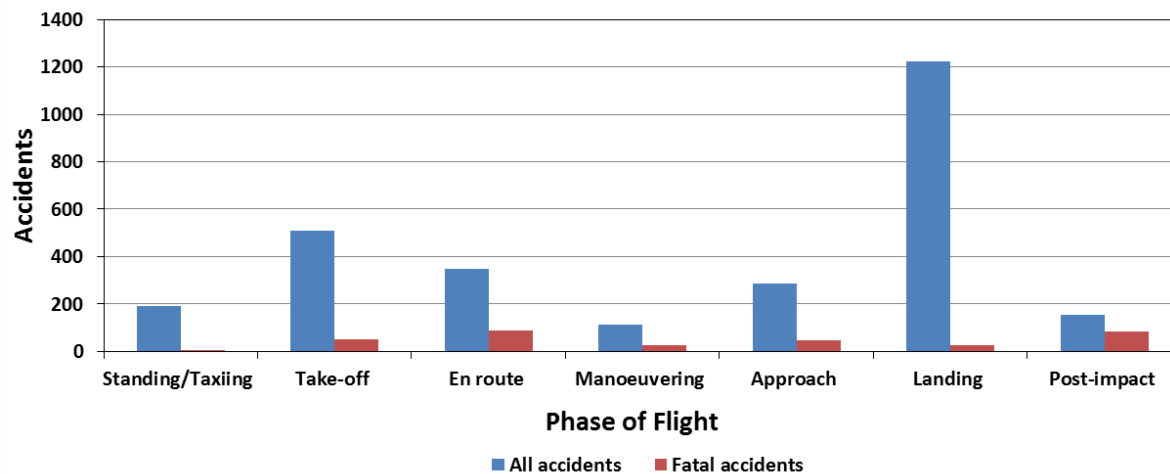
Accidents may be analyzed in more detail by examining the nature and distribution of selected events contributing to an occurrence. Tables 11 and 12 show counts of accidents involving selected event types within each phase of flight.

Although a single accident may involve more than one event within a phase, that accident is only counted once in the phase total. Therefore, the total of events within a phase will not sum to phase event 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. In addition, approximately 5% of aeroplane accidents and 25% of helicopter accidents involve events in more than one phase of flight (not including "post-

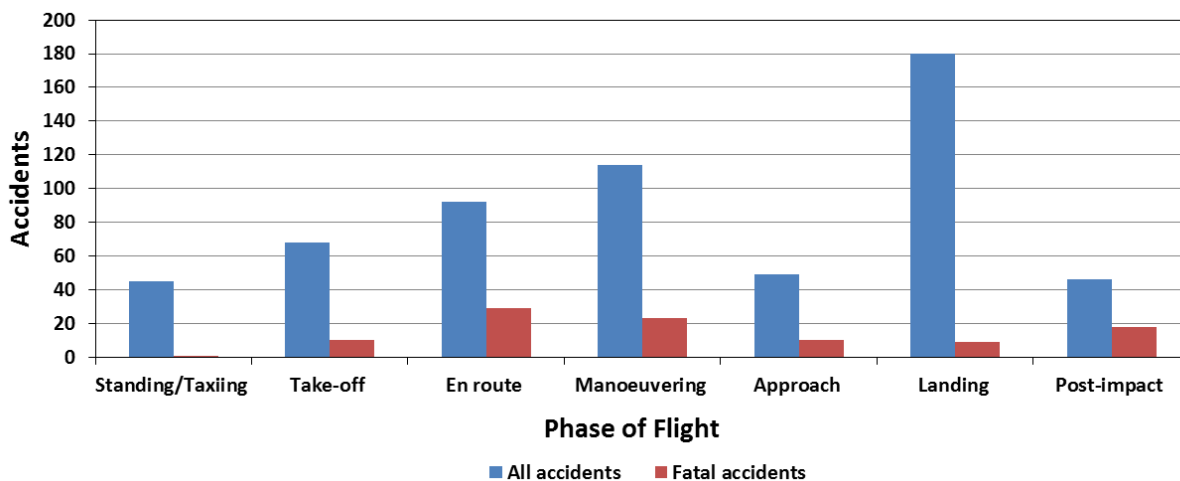
impact"), so the accidents shown in Figure 5 and Figure 6 sum to more than the total of accidents.

In 2011, the greatest numbers of aeroplane accidents were associated with landing (56%) and take-off (20%) phases of flight, followed by en route (15%) and approach (11%) phases. The greatest numbers of helicopter accidents were associated with en route (28%) and manoeuvring<sup>4</sup> (25%) phases of flight, followed by the landing phase (19%).

**Figure 5 - Aeroplane Accidents by Event Phase of Flight, 2002-2011**



**Figure 6 - Helicopter Accidents by Event Phase of Flight, 2002-2011**



From 2002 to 2011, of the 1224 aeroplane accidents with landing phase events, 26% involved missing or going off the runway, 23% involved collision with object, 18% involved landing gear collapse or retraction, and 18% involved a nosedown or overturning event. Of the 508 aeroplane accidents with take-off phase events, 30% involved collision with terrain, 28% involved loss of control, and 28% involved collision with object.

Collision with terrain was the predominant event in fatal aeroplane accidents from 2002 to 2011. Collision with terrain was involved in 63% of the 51 fatal aeroplane accidents with takeoff phase events, 61% of 89 fatal aeroplane accidents with en route phase events, 65% of 26 fatal aeroplane accidents with manoeuvring phase events, 75% of 48 fatal aeroplane accidents with approach

<sup>4</sup> Manoeuvring (i.e., low altitude/aerobatic flight operations) does not occur on all flights.

phase events, and 43% of 28 fatal aeroplane accidents with landing phase events.

From 2002 to 2011, of the 180 helicopter accidents with landing phase events, 28% involved a hard landing, 25% involved collision with terrain, 19% involved loss of control, and 19% involved a collision with object. Of the 114 helicopter accidents with manoeuvring phase events, 40% involved collision with terrain, 28% involved loss of control, and 22% involved collision with object.

Collision with terrain was also the predominant event in fatal helicopter accidents from 2002 to 2011. Collision with terrain was involved in 8 of 10 fatal helicopter accidents with takeoff phase events, 21 of 29 fatal helicopter accidents with en route phase events, 16 of 23 fatal helicopter accidents with manoeuvring phase events, 4 of 10 fatal helicopter accidents with approach phase events, and 6 of 9 fatal helicopter accidents with landing phase events.

**Operation Type (Table 6):** In 2011, aeroplane accidents occurred mainly on recreational flights (53%), followed by air transport (18%) and training flights (15%). Helicopter accidents occurred mainly on air transport flights (37%) and recreational flights (26%).

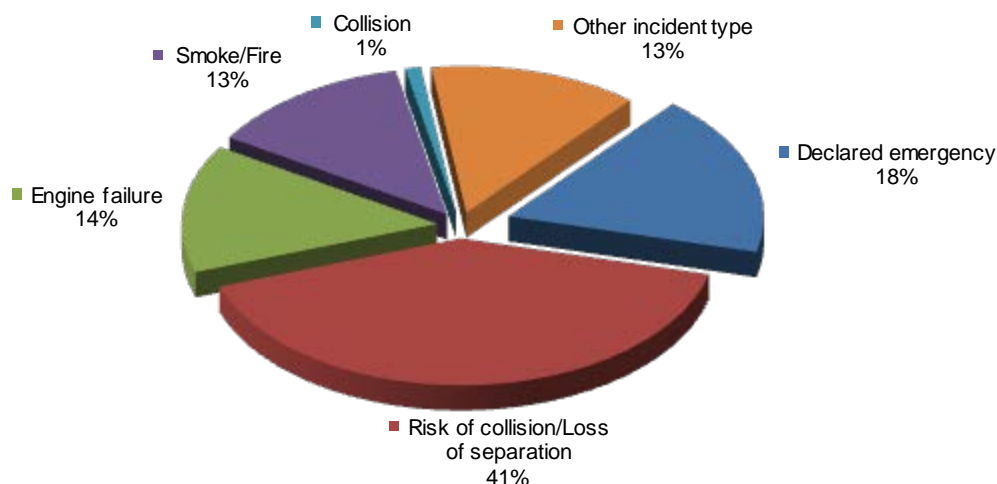
## INCIDENTS

### *Overview of Incidents (Tables 1, 9 and 10)*

Pursuant to TSB mandatory incident reporting requirements, 675 incidents were reported in 2011, 573 of which involved Canadian-registered aircraft.

In 2011, the most frequent incident types were declared emergency (41%), risk of collision or loss of separation (18%), and engine failure (14%) (Figure 7).

**Figure 7—Reportable Incidents by Type, 2011**





# APPENDIX A – AVIATION OCCURRENCE TABLES

**Table 1**  
**Reportable aviation occurrences**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Accidents</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>323</b>	<b>294</b>	<b>297</b>	<b>288</b>	<b>257</b>
Accidents in Canada involving Canadian-registered aircraft	297	335	279	283	278	300	274	271	273	240
Accidents outside Canada involving Canadian-registered aircraft	12	7	9	7	11	13	7	11	1	7
Accidents in Canada involving foreign-registered aircraft	15	31	21	18	14	10	15	15	14	10
<b>Accidents by operator type</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>323</b>	<b>294</b>	<b>297</b>	<b>288</b>	<b>257</b>
Commercial	108	106	87	94	105	98	95	74	86	77
Airliner (705)	6	7	3	4	7	4	6	2	6	6
Commuter (704)	6	9	1	7	4	4	5	6	7	6
Air taxi (703)	57	45	58	56	63	53	64	44	44	37
Aerial work (702)	37	41	21	26	30	34	19	20	28	27
Foreign/Other commercial type (a)	2	4	4	2	1	4	2	2	1	1
State	5	8	4	2	4	2	5	4	5	2
Corporate	6	4	6	10	3	10	4	6	2	7
Private/Other operator type (b)	206	257	213	201	191	213	191	215	195	172
<b>Accidents by aircraft type</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>323</b>	<b>294</b>	<b>297</b>	<b>288</b>	<b>257</b>
Aeroplane	219	271	221	218	216	243	208	223	220	201
Helicopter	58	44	41	50	56	46	44	33	31	36
Ultralight	36	47	37	31	28	30	29	35	30	17
Other aircraft type (c)	12	11	9	8	4	5	13	7	7	3
<b>Number of aircraft involved in accidents*</b>	<b>327</b>	<b>376</b>	<b>314</b>	<b>314</b>	<b>311</b>	<b>327</b>	<b>300</b>	<b>303</b>	<b>290</b>	<b>261</b>
Aeroplanes	221	273	225	224	223	245	214	228	222	204
Helicopters	58	44	42	51	56	47	44	33	31	36
Ultralights	36	47	38	31	28	30	29	35	30	17
Other aircraft type(c)	12	12	9	8	4	5	13	7	7	4
<b>Fatal accidents by aircraft type</b>	<b>42</b>	<b>45</b>	<b>33</b>	<b>44</b>	<b>34</b>	<b>38</b>	<b>38</b>	<b>33</b>	<b>36</b>	<b>35</b>
Aeroplane	22	32	20	27	24	25	16	21	28	23
Helicopter	7	3	5	10	9	6	9	8	3	8
Ultralight	9	7	6	5	1	5	12	3	3	3
Other aircraft type (c)	4	3	2	2	0	2	1	1	2	1
<b>Fatalities</b>	<b>67</b>	<b>76</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>56</b>	<b>64</b>	<b>70</b>	<b>70</b>	<b>70</b>
<b>Serious injuries</b>	<b>46</b>	<b>61</b>	<b>37</b>	<b>61</b>	<b>53</b>	<b>65</b>	<b>50</b>	<b>46</b>	<b>36</b>	<b>43</b>
<b>Accidents in Canada involving foreign-registered aircraft</b>	<b>15</b>	<b>31</b>	<b>21</b>	<b>18</b>	<b>14</b>	<b>10</b>	<b>15</b>	<b>15</b>	<b>14</b>	<b>10</b>
Fatal accidents	2	6	3	6	2	0	0	2	2	2
Fatalities	4	8	10	10	2	0	0	2	2	2
Serious injuries	1	4	3	15	1	2	5	3	1	1
<b>Incidents (d)</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Incidents in Canada involving Canadian-registered aircraft	661	577	645	571	580	622	651	590	583	518
Incidents outside Canada involving Canadian-registered aircraft	71	100	89	79	78	69	78	66	83	55
Incidents in Canada involving foreign-registered aircraft	152	135	164	184	188	224	194	155	188	127
<b>Incidents by type (d)</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Risk of collision/Loss of separation	189	142	216	174	168	168	172	153	206	120
Declared emergency	279	279	264	222	260	298	314	312	310	275
Engine failure	151	122	134	139	130	129	120	106	87	95
Smoke/Fire	98	96	90	99	102	123	107	97	81	88
Collision	22	16	21	12	21	13	8	9	4	7
Other incident type	105	127	140	150	126	143	166	111	127	90

Data extracted February 15, 2012.

Accidents and reportable incidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns may not add up to totals. For example, in the total "Accidents by aircraft type", when an occurrence involves an airplane and a helicopter, the occurrence is counted in each category, but only once in the total.

\* "Number of aircraft involved in accidents" are aircraft counts, all other data are accident counts.

a. The commercial service type is not available for foreign-registered aircraft.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e., flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

d. Reportable incidents include aeroplanes having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, and rotorcraft having a MCTOW greater than 2250 kg.

**Table 2**  
**Occurrences involving Canadian-registered aircraft**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Accidents by aircraft and operator type (a)</b>	<b>274</b>	<b>295</b>	<b>252</b>	<b>259</b>	<b>262</b>	<b>284</b>	<b>252</b>	<b>249</b>	<b>244</b>	<b>230</b>
Aeroplane accidents	208	240	203	203	202	234	197	210	209	192
Commercial	65	68	53	57	54	58	63	54	57	49
Airliner (705)	6	7	3	4	7	4	6	2	6	5
Commuter (704)	6	9	1	6	4	4	5	5	6	4
Air taxi (703)	41	35	41	33	30	39	41	36	28	26
Aerial work (702)	12	17	8	14	13	11	12	10	17	14
Other commercial type	0	0	0	0	0	0	0	1	0	0
State	3	3	2	1	4	1	3	2	3	2
Corporate	2	2	4	6	2	7	4	4	2	4
Private/Other operator type (b)	138	169	145	139	142	168	127	152	147	138
Helicopter accidents	56	44	40	49	56	45	42	32	29	35
Commercial	40	35	31	35	50	34	28	19	27	26
State	1	2	1	1	0	1	0	0	0	0
Corporate	2	0	0	0	0	3	0	1	0	1
Private/Other operator type (b)	13	7	8	13	6	7	14	12	2	8
Other aircraft type (c)	10	11	9	8	4	5	13	7	6	3
<b>Fatal accidents by aircraft and operator type (a)</b>	<b>31</b>	<b>32</b>	<b>24</b>	<b>34</b>	<b>31</b>	<b>33</b>	<b>26</b>	<b>28</b>	<b>31</b>	<b>30</b>
Aeroplane accidents	22	26	18	22	22	25	16	20	27	21
Commercial	6	8	3	9	6	7	3	5	12	10
Airliner (705)	0	0	0	0	0	0	0	0	0	1
Commuter (704)	0	0	0	1	0	1	0	0	1	1
Air taxi (703)	5	5	3	6	5	5	3	5	7	6
Aerial work (702)	1	3	0	2	1	1	0	0	4	2
Other commercial type	0	0	0	0	0	0	0	0	0	0
State	1	0	0	0	1	0	0	0	0	0
Corporate	0	0	0	0	0	1	2	0	0	0
Private/Other operator type (b)	15	18	15	13	15	17	11	15	15	11
Helicopter accidents	6	3	4	10	9	6	9	7	3	8
Other aircraft type (c)	3	3	2	2	0	2	1	1	1	1
<b>Fatalities (a)</b>	<b>51</b>	<b>59</b>	<b>37</b>	<b>55</b>	<b>52</b>	<b>50</b>	<b>51</b>	<b>64</b>	<b>64</b>	<b>65</b>
<b>Serious injuries (a)</b>	<b>42</b>	<b>42</b>	<b>27</b>	<b>37</b>	<b>40</b>	<b>56</b>	<b>40</b>	<b>34</b>	<b>31</b>	<b>37</b>
<b>Incidents by type (d)</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>729</b>	<b>656</b>	<b>666</b>	<b>573</b>
Risk of collision/Loss of separation	169	124	182	150	150	152	149	137	179	105
Declared emergency	231	229	204	152	184	186	235	236	238	224
Engine failure	134	104	118	116	106	108	98	93	67	87
Smoke/Fire	83	82	81	85	86	106	90	84	70	67
Collision	19	16	21	8	18	9	7	7	3	7
Other incident type	96	122	128	139	114	130	150	99	109	83
<b>Accidents involving ultralight aircraft</b>	<b>36</b>	<b>47</b>	<b>36</b>	<b>31</b>	<b>28</b>	<b>30</b>	<b>29</b>	<b>34</b>	<b>30</b>	<b>17</b>
Fatal accidents	9	7	6	5	1	5	12	3	3	3
Fatalities	12	9	10	6	1	6	13	4	4	3
Serious injuries	3	15	7	9	12	7	5	9	4	5

Data extracted February 15, 2012.

Accidents and reportable incidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences. Breakdowns may not add up to totals. For example, in the total "Number of accidents by aircraft type", when an occurrence involves an airplane and a helicopter, the occurrence is counted in each category, but only once in the total.

a. Accidents involving Canadian-registered aircraft, excluding ultralights.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e. flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

d. Reportable incidents include aeroplanes having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, and rotorcraft having a MCTOW greater than 2250 kg.

**Table 3a****Accident rates involving Canadian-registered aircraft (per hours flown, excluding ultralights and other aircraft types)****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Accidents	264	284	243	251	258	279	239	242	238	227
Fatal accidents	28	29	22	32	31	31	25	27	30	29
Fatalities	48	56	35	52	52	47	50	63	63	63
Hours flown (thousands) (a)	3,777	3,574	3,750	3,750	3,891	4,193	4,193	3,797	4,099	3,966
Accidents per 100,000 hours	7.0	7.9	6.5	6.7	6.6	6.7	5.7	6.4	5.8	5.7
Fatal accidents per 100,000 hours	0.7	0.8	0.6	0.9	0.8	0.7	0.6	0.7	0.7	0.7
Fatalities per 100,000 hours	1.3	1.6	0.9	1.4	1.3	1.1	1.2	1.7	1.5	1.6

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

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

a. Source: Transport Canada (2010 and 2011 hours flown are estimated).

**Table 3b****Aircraft accident rates in Canada (per movements, excluding ultralights and other aircraft types)****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Accidents	265	308	253	260	261	277	245	246	250	230
Fatal accidents	26	34	23	36	29	30	21	28	31	30
Fatalities	45	63	43	59	49	44	43	64	64	64
Aircraft movements (thousands) (a)	6,649	6,369	6,183	6,156	6,308	6,824	6,852	6,540	6,412	6,245
Accidents per 100,000 aircraft movements	4.0	4.8	4.1	4.2	4.1	4.1	3.6	3.8	3.9	3.7
Fatal accidents per 100,000 aircraft movements	0.4	0.5	0.4	0.6	0.5	0.4	0.3	0.4	0.5	0.5
Fatalities per 100,000 aircraft movements	0.7	1.0	0.7	1.0	0.8	0.6	0.6	1.0	1.0	1.0

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Excluding ultralights, balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

a. Source: Statistics Canada (2011 movements are estimated).

**Table 4**  
**Aircraft accident fatalities**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Fatalities</b>	<b>67</b>	<b>76</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>56</b>	<b>64</b>	<b>70</b>	<b>70</b>	<b>70</b>
Fatalities in Canada involving Canadian-registered aircraft	58	67	45	60	48	53	57	66	68	67
Fatalities outside Canada involving Canadian-registered aircraft	5	1	2	1	5	3	7	2	0	1
Fatalities in Canada involving foreign-registered aircraft	4	8	10	10	2	0	0	2	2	2
<b>Fatalities by operator type</b>	<b>67</b>	<b>76</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>56</b>	<b>64</b>	<b>70</b>	<b>70</b>	<b>70</b>
Commercial	16	21	25	26	28	19	25	36	36	41
Airliner (705)	0	0	0	0	0	0	0	0	0	12
Commuter (704)	0	0	0	2	0	1	0	17	1	2
Air taxi (703)	9	15	18	17	18	10	20	18	28	16
Aerial work (702)	5	6	0	7	10	9	5	1	7	11
Foreign/Other commercial type (a)	2	0	7	0	0	0	0	0	0	0
State	3	4	0	0	1	0	0	0	0	0
Corporate	0	0	0	1	0	1	7	0	0	2
Private/Other operator type (b)	48	51	32	42	26	36	32	34	34	27
<b>Crew fatalities by operator type</b>	<b>39</b>	<b>43</b>	<b>37</b>	<b>44</b>	<b>32</b>	<b>37</b>	<b>35</b>	<b>34</b>	<b>39</b>	<b>37</b>
Commercial	8	11	11	15	12	12	8	10	17	18
Airliner (705)	0	0	0	0	0	0	0	0	0	4
Commuter (704)	0	0	0	2	0	0	0	2	1	2
Air taxi (703)	2	5	4	9	5	7	6	7	11	7
Aerial work (702)	4	6	0	4	7	6	2	1	5	5
Foreign/Other commercial type (a)	2	0	7	0	0	0	0	0	0	0
State	3	1	0	0	1	0	0	0	0	0
Corporate	0	0	0	1	0	1	2	0	0	2
Private/Other operator type (b)	28	31	26	28	19	24	25	24	22	17
<b>Passenger fatalities by operator type</b>	<b>27</b>	<b>33</b>	<b>20</b>	<b>25</b>	<b>22</b>	<b>19</b>	<b>28</b>	<b>36</b>	<b>30</b>	<b>29</b>
Commercial	7	10	14	11	15	7	16	26	18	20
Airliner (705)	0	0	0	0	0	0	0	0	0	8
Commuter (704)	0	0	0	0	0	1	0	15	0	0
Air taxi (703)	7	10	14	8	12	3	14	11	16	9
Aerial work (702)	0	0	0	3	3	3	2	0	2	3
Foreign/Other commercial type (a)	0	0	0	0	0	0	0	0	0	0
State	0	3	0	0	0	0	0	0	0	0
Corporate	0	0	0	0	0	0	5	0	0	0
Private/Other operator type (b)	20	20	6	14	7	12	7	10	12	9
<b>Ground fatalities</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>4</b>
<b>Fatalities by aircraft type</b>	<b>67</b>	<b>76</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>56</b>	<b>64</b>	<b>70</b>	<b>70</b>	<b>70</b>
Aeroplane	41	58	40	45	42	39	34	38	57	47
Helicopter	9	6	5	15	12	8	16	27	7	18
Ultralight	12	9	10	6	1	6	13	4	4	3
Other aircraft type (c)	5	3	2	3	0	3	1	1	2	2

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns may not add up to totals. For example, in the total "Fatalities by aircraft type", when an occurrence involves an airplane and a helicopter, a fatality is counted in each category, but only once in the total.

a. The commercial service type is not available for foreign-registered aircraft.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e., flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

**Table 5**  
**Aircraft accident serious injuries**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Serious injuries</b>	<b>46</b>	<b>61</b>	<b>37</b>	<b>61</b>	<b>53</b>	<b>65</b>	<b>50</b>	<b>46</b>	<b>36</b>	<b>43</b>
Serious injuries in Canada involving Canadian-registered aircraft	41	55	34	45	51	61	45	42	35	33
Serious injuries outside Canada involving Canadian-registered aircraft	4	2	0	1	1	2	0	1	0	9
Serious injuries in Canada involving foreign-registered aircraft	1	4	3	15	1	2	5	3	1	1
<b>Serious injuries by operator type</b>	<b>46</b>	<b>61</b>	<b>37</b>	<b>61</b>	<b>53</b>	<b>65</b>	<b>50</b>	<b>46</b>	<b>36</b>	<b>43</b>
Commercial	20	20	14	24	20	30	24	11	16	25
Airliner (705)	0	1	0	1	1	0	1	1	1	10
Commuter (704)	1	7	0	0	0	1	2	1	4	2
Air taxi (703)	16	7	10	4	16	15	18	6	7	8
Aerial work (702)	3	5	2	7	2	14	3	3	4	5
Foreign/Other commercial type (a)	0	0	2	12	1	0	0	0	0	0
State	1	0	0	1	2	3	0	2	1	0
Corporate	1	0	0	4	0	1	0	3	0	0
Private/Other operator type (b)	24	41	23	33	31	31	26	30	19	18
<b>Crew serious injuries by operator type</b>	<b>28</b>	<b>41</b>	<b>26</b>	<b>37</b>	<b>28</b>	<b>30</b>	<b>25</b>	<b>27</b>	<b>22</b>	<b>18</b>
Commercial	7	12	8	11	9	10	11	5	6	6
Airliner (705)	0	0	0	1	1	0	0	0	0	0
Commuter (704)	0	3	0	0	0	1	0	0	1	0
Air taxi (703)	5	4	4	2	6	3	9	2	2	2
Aerial work (702)	2	5	2	6	2	6	2	3	3	4
Foreign/Other commercial type (a)	0	0	2	2	0	0	0	0	0	0
State	1	0	0	1	1	1	0	1	1	0
Corporate	1	0	0	2	0	0	0	2	0	0
Private/Other operator type (b)	19	29	18	23	18	19	14	19	15	12
<b>Passenger serious injuries by operator type</b>	<b>16</b>	<b>16</b>	<b>9</b>	<b>22</b>	<b>23</b>	<b>32</b>	<b>25</b>	<b>19</b>	<b>13</b>	<b>24</b>
Commercial	11	7	5	11	10	20	13	6	10	18
Airliner (705)	0	0	0	0	0	0	1	1	1	10
Commuter (704)	1	4	0	0	0	0	2	1	3	2
Air taxi (703)	9	3	5	1	9	12	9	4	5	6
Aerial work (702)	1	0	0	0	0	8	1	0	1	0
Foreign/Other commercial type (a)	0	0	0	10	1	0	0	0	0	0
State	0	0	0	0	1	2	0	1	0	0
Corporate	0	0	0	1	0	1	0	1	0	0
Private/Other operator type (b)	5	9	4	10	12	9	12	11	3	6
<b>Ground serious injuries</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>Serious injuries by aircraft type</b>	<b>46</b>	<b>61</b>	<b>37</b>	<b>61</b>	<b>53</b>	<b>65</b>	<b>50</b>	<b>46</b>	<b>36</b>	<b>43</b>
Aeroplane	32	38	20	41	28	32	29	24	28	30
Helicopter	8	7	6	10	9	13	14	11	3	8
Ultralight	3	15	8	9	12	7	5	9	4	5
Other aircraft type (c)	3	1	3	2	4	13	2	2	1	0

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns may not add up to totals. For example, in the total "Serious injuries by aircraft type", when an occurrence involves an airplane and a helicopter, a serious injury is counted in each category, but only once in the total.

a. The commercial service type is not available for foreign-registered aircraft.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e., flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

**Table 6****Accidents involving Canadian-registered aeroplanes and helicopters by operation type****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Aeroplane accidents by operation type</b>	<b>208</b>	<b>240</b>	<b>203</b>	<b>203</b>	<b>202</b>	<b>234</b>	<b>197</b>	<b>210</b>	<b>209</b>	<b>192</b>
Training	20	34	25	16	33	33	30	43	28	28
Pleasure/Travel	102	122	118	116	96	118	83	109	108	102
Business	6	8	4	6	8	15	7	4	6	7
Forest fire management	2	2	3	2	4	0	1	3	2	1
Test/Demonstration/Ferry	6	5	7	5	6	8	4	0	6	4
Aerial application	6	13	3	6	8	8	9	4	10	4
Inspection	4	1	0	1	1	0	1	1	1	0
Air transport	49	42	35	35	37	40	46	34	37	35
Air ambulance	2	1	2	1	3	2	3	5	2	1
Sightseeing	1	4	0	2	3	1	2	2	1	2
Other/Unknown	10	10	6	14	5	9	11	8	9	10
<b>Aeroplane fatal accidents by operation type</b>	<b>22</b>	<b>26</b>	<b>18</b>	<b>22</b>	<b>22</b>	<b>25</b>	<b>16</b>	<b>20</b>	<b>27</b>	<b>21</b>
Training	1	3	4	0	4	3	0	1	1	1
Pleasure/Travel	11	15	10	12	11	10	8	13	14	10
Business	0	0	0	0	1	1	2	1	1	0
Forest fire management	0	1	0	0	0	0	0	0	2	0
Test/Demonstration/Ferry	2	0	0	1	1	4	1	0	0	0
Aerial application	0	1	0	0	0	1	1	0	0	0
Inspection	2	0	0	0	0	0	0	0	0	0
Air transport	5	4	3	7	5	4	3	4	7	8
Air ambulance	0	0	0	0	0	1	0	1	0	0
Sightseeing	1	0	0	0	0	1	0	0	0	1
Other/Unknown	0	2	1	2	1	0	1	0	2	1
<b>Helicopter accidents by operation type</b>	<b>56</b>	<b>44</b>	<b>40</b>	<b>49</b>	<b>56</b>	<b>45</b>	<b>42</b>	<b>32</b>	<b>29</b>	<b>35</b>
Training	9	6	4	3	2	3	6	5	0	2
Pleasure/Travel	2	1	5	11	4	4	9	5	2	9
Business	6	1	0	1	0	5	0	3	0	0
Forest fire management	6	6	4	1	3	0	0	4	1	2
Test/Demonstration/Ferry	5	0	2	0	2	3	0	0	1	1
Aerial application	1	2	1	2	0	2	1	0	3	1
Inspection	1	4	2	0	1	1	0	0	1	2
Air transport	14	11	15	19	29	16	22	10	15	13
Air ambulance	0	0	0	1	0	0	1	0	0	0
Sightseeing	0	0	0	0	0	0	0	1	0	0
Other/Unknown	12	13	7	11	15	12	3	4	6	5
<b>Fatal helicopter accidents by operation type</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>10</b>	<b>9</b>	<b>6</b>	<b>9</b>	<b>7</b>	<b>3</b>	<b>8</b>
Training	0	0	0	0	0	0	0	1	0	1
Pleasure/Travel	0	0	1	5	0	0	3	2	0	2
Business	1	0	0	1	0	1	0	0	0	0
Forest fire management	0	1	0	0	2	0	0	1	0	1
Test/Demonstration/Ferry	2	0	0	0	1	0	0	0	1	1
Aerial application	0	0	0	0	0	0	0	0	0	0
Inspection	0	0	1	0	0	1	0	0	0	1
Air transport	0	0	2	3	2	3	4	3	2	1
Air ambulance	0	0	0	0	0	0	0	0	0	0
Sightseeing	0	0	0	0	0	0	0	0	0	0
Other/Unknown	3	2	0	1	4	2	2	0	0	1

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns may not add up to totals. For example, in the total "Airplane accidents by operation type", when an occurrence involves a Business and an Inspection airplane, the occurrence is counted in each category, but only once in the total.

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

**Table 7**  
**Aircraft accidents by province/territory**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Accidents by province/territory</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>323</b>	<b>294</b>	<b>297</b>	<b>288</b>	<b>257</b>
Newfoundland and Labrador	7	12	5	5	4	6	7	3	3	3
Prince Edward Island	0	2	0	1	0	0	0	1	0	0
Nova Scotia	9	1	5	0	2	4	6	3	7	5
New Brunswick	2	1	8	6	3	8	1	2	5	3
Quebec	49	67	55	64	56	72	58	68	65	58
Ontario	93	115	92	73	60	81	69	74	71	63
Manitoba	20	32	12	19	21	18	27	19	27	17
Saskatchewan	18	20	13	15	19	23	19	14	18	18
Alberta	50	40	33	34	44	32	33	31	25	22
British Columbia	53	65	60	70	64	46	44	59	47	43
Yukon	5	6	7	5	4	7	7	4	3	8
Northwest Territories	4	4	7	5	5	8	8	6	9	6
Nunavut	2	1	2	2	8	5	8	2	7	4
Other air space under Canadian air traffic control	0	0	0	0	2	0	0	0	0	0
Outside Canada	12	7	9	7	11	13	7	11	1	7
<b>Fatal accidents by province/territory</b>	<b>42</b>	<b>45</b>	<b>33</b>	<b>44</b>	<b>34</b>	<b>38</b>	<b>38</b>	<b>33</b>	<b>36</b>	<b>35</b>
Newfoundland and Labrador	1	3	1	1	0	1	0	2	1	0
Prince Edward Island	0	0	0	0	0	0	0	1	0	0
Nova Scotia	3	0	2	0	0	1	0	0	1	1
New Brunswick	0	0	0	1	1	0	0	0	2	0
Quebec	7	10	6	10	4	6	5	9	9	5
Ontario	10	14	6	7	4	6	7	6	9	6
Manitoba	1	0	2	2	0	3	1	0	1	1
Saskatchewan	2	1	2	1	4	5	0	2	0	3
Alberta	2	5	2	5	6	3	8	1	2	4
British Columbia	13	10	8	16	9	10	10	8	7	10
Yukon	0	1	0	0	1	1	1	1	0	1
Northwest Territories	0	0	1	0	1	1	2	1	3	2
Nunavut	0	0	1	0	0	0	0	0	1	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	3	1	2	1	4	1	4	2	0	1
<b>Fatalities by province/territory</b>	<b>67</b>	<b>76</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>56</b>	<b>64</b>	<b>70</b>	<b>70</b>	<b>70</b>
Newfoundland and Labrador	2	5	1	2	0	1	0	18	2	0
Prince Edward Island	0	0	0	0	0	0	0	1	0	0
Nova Scotia	3	0	8	0	0	1	0	0	2	1
New Brunswick	0	0	0	1	1	0	0	0	2	0
Quebec	15	15	7	14	7	7	7	15	26	9
Ontario	14	30	22	11	6	7	8	12	14	12
Manitoba	1	0	2	2	0	5	1	0	1	1
Saskatchewan	2	1	2	2	4	6	0	4	0	8
Alberta	3	7	2	8	9	5	12	1	4	5
British Columbia	22	16	8	28	16	17	26	14	15	16
Yukon	0	1	0	0	1	1	1	1	0	1
Northwest Territories	0	0	2	0	6	3	2	2	3	4
Nunavut	0	0	1	0	0	0	0	0	1	12
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	5	1	2	1	5	3	7	2	0	1

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

**Table 8****Accidents involving Canadian-registered aircraft by province/territory (excluding ultralights)****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Accidents by province/territory</b>	<b>274</b>	<b>295</b>	<b>252</b>	<b>259</b>	<b>262</b>	<b>284</b>	<b>252</b>	<b>249</b>	<b>244</b>	<b>230</b>
Newfoundland and Labrador	6	9	5	5	3	5	5	3	3	3
Prince Edward Island	0	1	0	1	0	0	0	1	0	0
Nova Scotia	7	1	3	0	0	3	2	1	7	3
New Brunswick	2	1	5	5	2	7	1	2	4	3
Quebec	42	55	44	56	48	61	50	60	52	52
Ontario	74	80	71	57	52	71	62	61	55	56
Manitoba	17	28	12	18	17	17	24	19	25	16
Saskatchewan	18	16	13	13	18	21	18	12	18	17
Alberta	46	34	29	28	41	31	28	28	24	18
British Columbia	41	54	46	59	53	36	33	44	38	39
Yukon	4	4	6	3	4	6	7	2	3	7
Northwest Territories	4	4	7	5	5	8	8	5	8	6
Nunavut	1	1	2	2	8	5	7	1	6	3
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	12	7	9	7	11	13	7	10	1	7
<b>Fatal accidents by province/territory</b>	<b>31</b>	<b>32</b>	<b>24</b>	<b>34</b>	<b>31</b>	<b>33</b>	<b>26</b>	<b>28</b>	<b>31</b>	<b>30</b>
Newfoundland and Labrador	1	2	1	1	0	1	0	2	1	0
Prince Edward Island	0	0	0	0	0	0	0	1	0	0
Nova Scotia	2	0	1	0	0	0	0	0	1	0
New Brunswick	0	0	0	1	0	0	0	0	2	0
Quebec	6	5	4	9	3	4	4	8	8	5
Ontario	5	11	2	6	4	6	4	5	8	4
Manitoba	1	0	2	2	0	3	1	0	1	1
Saskatchewan	2	1	2	0	3	4	0	1	0	3
Alberta	2	3	2	2	6	3	4	1	2	3
British Columbia	9	8	6	12	9	9	6	8	5	9
Yukon	0	1	0	0	1	1	1	0	0	1
Northwest Territories	0	0	1	0	1	1	2	1	2	2
Nunavut	0	0	1	0	0	0	0	0	1	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	3	1	2	1	4	1	4	1	0	1
<b>Fatalities by province/territory</b>	<b>51</b>	<b>59</b>	<b>37</b>	<b>55</b>	<b>52</b>	<b>50</b>	<b>51</b>	<b>64</b>	<b>64</b>	<b>65</b>
Newfoundland and Labrador	2	3	1	2	0	1	0	18	2	0
Prince Edward Island	0	0	0	0	0	0	0	1	0	0
Nova Scotia	2	0	1	0	0	0	0	0	2	0
New Brunswick	0	0	0	1	0	0	0	0	2	0
Quebec	14	9	4	12	6	5	6	14	25	9
Ontario	6	27	14	10	6	7	4	11	12	10
Manitoba	1	0	2	2	0	5	1	0	1	1
Saskatchewan	2	1	2	0	3	5	0	2	0	8
Alberta	3	4	2	4	9	5	8	1	4	4
British Columbia	16	13	6	23	16	15	22	14	13	15
Yukon	0	1	0	0	1	1	1	0	0	1
Northwest Territories	0	0	2	0	6	3	2	2	2	4
Nunavut	0	0	1	0	0	0	0	0	1	12
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	5	1	2	1	5	3	7	1	0	1

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.



**Table 9**  
**Reportable aircraft incidents**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Incidents by type</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Risk of collision/Loss of separation	189	142	216	174	168	168	172	153	206	120
Declared emergency	279	279	264	222	260	298	314	312	310	275
Engine failure	151	122	134	139	130	129	120	106	87	95
Smoke/Fire	98	96	90	99	102	123	107	97	81	88
Collision	22	16	21	12	21	13	8	9	4	7
Control difficulties	31	41	43	44	41	41	39	24	32	31
Crew unable to perform duties	38	49	55	67	57	65	78	59	50	24
Dangerous goods-related	1	2	0	1	2	3	1	3	1	0
Depressurization	18	21	9	14	9	13	17	6	11	16
Fuel shortage	3	6	13	10	6	8	7	4	9	6
Failure to remain in landing area	8	3	11	11	7	9	18	9	14	11
Incorrect fuel	1	0	2	1	1	0	1	0	0	0
Slung load released	3	4	5	1	3	3	5	3	9	1
Transmission or gearbox failure	2	1	2	1	0	1	0	3	1	1
<b>Incidents by operator type</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Commercial	774	736	819	732	773	823	857	749	776	635
Airliner (705)	560	524	578	488	528	563	590	498	519	445
Commuter (704)	84	68	91	89	80	75	94	87	85	75
Air taxi (703)	42	34	37	39	52	25	36	43	31	29
Aerial work (702)	18	33	38	22	20	20	24	31	26	15
Foreign/Other commercial type (a)	126	121	144	151	165	196	181	138	170	111
State	34	26	29	28	21	29	17	23	26	14
Corporate	47	34	34	45	30	43	21	29	20	22
Private/Other operator type (b)	47	19	37	40	31	24	33	27	32	25
<b>Incidents by aircraft type</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Aeroplane	823	758	845	779	787	854	870	770	790	657
Helicopter	23	30	28	20	29	22	19	21	33	20
Ultralight/Other aircraft type (c)	1	0	0	1	1	0	1	1	1	0
<b>Number of aircraft involved in incidents*</b>	<b>1013</b>	<b>907</b>	<b>1038</b>	<b>956</b>	<b>974</b>	<b>1031</b>	<b>1052</b>	<b>914</b>	<b>979</b>	<b>777</b>
Aeroplanes	988	876	1008	935	942	1009	1032	891	945	757
Helicopters	24	31	30	20	30	22	19	22	33	20
Ultralight/Other aircraft type (c)	1	0	0	1	2	0	1	1	1	0
<b>Incidents by province/territory</b>	<b>844</b>	<b>782</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>887</b>	<b>788</b>	<b>815</b>	<b>675</b>
Newfoundland and Labrador	25	16	19	25	24	19	21	16	30	14
Prince Edward Island	1	1	2	1	2	1	2	2	0	1
Nova Scotia	13	18	23	14	17	26	20	18	25	19
New Brunswick	9	5	10	11	14	17	12	5	10	7
Quebec	87	104	85	123	101	127	127	97	109	126
Ontario	317	240	248	220	244	264	273	194	176	176
Manitoba	42	46	53	39	43	52	59	46	51	31
Saskatchewan	24	23	22	14	20	19	28	18	19	11
Alberta	95	99	118	108	111	79	89	106	84	82
British Columbia	110	99	142	93	83	133	120	162	156	76
Yukon	6	3	4	3	5	4	4	6	4	3
Northwest Territories	21	18	28	27	25	27	27	14	21	30
Nunavut	10	8	12	16	10	14	17	8	21	19
Other air space under Canadian air traffic control	1	1	10	23	30	23	10	30	26	25
Outside Canada	83	101	89	79	78	69	78	66	83	55

Data extracted February 15, 2012.

Reportable incidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Reportable incidents include aeroplanes having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, and rotorcraft having a MCTOW greater than 2250 kg.

Breakdowns may not add up to totals. For example, in the total "Incidents by aircraft type", when an occurrence involves an airplane and a helicopter, the occurrence is counted in each category, but only once in the total.

\* "Number of aircraft involved in incidents" are aircraft counts, all other data are incident counts.

a. The commercial service type is not available for foreign-registered aircraft.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e., flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

**Table 10**  
**Reportable incidents involving Canadian-registered aircraft**  
**2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Incidents by type</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>729</b>	<b>656</b>	<b>666</b>	<b>573</b>
Risk of collision/Loss of separation	169	124	182	150	150	152	149	137	179	105
Declared emergency	231	229	204	152	184	186	235	236	238	224
Engine failure	134	104	118	116	106	108	98	93	67	87
Smoke/Fire	83	82	81	85	86	106	90	84	70	67
Collision	19	16	21	8	18	9	7	7	3	7
Control difficulties	28	41	41	41	31	38	32	18	24	27
Crew unable to perform duties	37	48	51	67	56	63	76	57	49	24
Dangerous goods-related	0	2	0	1	2	3	1	3	1	0
Depressurization	18	17	7	12	9	11	15	3	10	15
Fuel shortage	1	6	10	5	6	4	4	4	6	5
Failure to remain in landing area	6	3	10	10	6	7	16	8	9	10
Incorrect fuel	1	0	2	1	1	0	1	0	0	0
Slung load released	3	4	5	1	3	3	5	3	9	1
Transmission or gearbox failure	2	1	2	1	0	1	0	3	1	1
<b>Incidents by operator type</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>729</b>	<b>656</b>	<b>666</b>	<b>573</b>
Commercial	677	636	700	604	635	660	704	625	636	544
Airliner (705)	560	520	578	487	524	563	586	494	518	443
Commuter (704)	84	68	91	89	79	75	94	87	85	75
Air taxi (703)	42	34	37	39	52	25	36	43	30	29
Aerial work (702)	18	33	38	22	20	17	24	30	26	15
Other commercial type (a)	29	25	25	24	31	36	32	19	31	22
State	29	26	27	25	20	28	16	20	22	14
Corporate	37	29	26	29	21	23	17	21	17	13
Private/Other operator type (b)	41	16	31	34	27	22	31	26	29	21
<b>Incidents by aircraft type</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>729</b>	<b>656</b>	<b>666</b>	<b>573</b>
Aeroplane	712	653	715	633	638	673	712	638	642	555
Helicopter	23	30	27	20	29	20	19	21	32	20
Ultralight/Other aircraft type (c)	0	0	0	1	1	0	1	1	1	0
<b>Number of aircraft involved in incidents*</b>	<b>886</b>	<b>786</b>	<b>886</b>	<b>785</b>	<b>803</b>	<b>833</b>	<b>874</b>	<b>772</b>	<b>812</b>	<b>666</b>
Aeroplanes	862	755	857	764	771	813	854	749	779	646
Helicopters	24	31	29	20	30	20	19	22	32	20
Ultralight/Other aircraft type (c)	0	0	0	1	2	0	1	1	1	0
<b>Incidents by province/territory</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>729</b>	<b>656</b>	<b>666</b>	<b>573</b>
Newfoundland and Labrador	15	9	10	14	13	10	13	7	13	10
Prince Edward Island	1	1	1	0	2	0	1	1	0	0
Nova Scotia	9	12	18	7	12	17	12	13	19	14
New Brunswick	7	3	10	7	9	12	7	3	8	5
Quebec	73	85	66	98	79	90	96	77	90	104
Ontario	276	205	211	175	198	202	222	167	141	146
Manitoba	38	40	43	31	35	43	49	40	45	30
Saskatchewan	20	18	19	11	19	16	26	16	15	11
Alberta	88	88	105	95	99	67	76	92	74	76
British Columbia	97	87	122	85	72	120	103	141	134	68
Yukon	5	3	2	2	3	4	2	6	3	3
Northwest Territories	20	18	27	25	21	27	27	14	19	30
Nunavut	9	8	9	14	10	9	14	7	17	16
Other air space under Canadian air traffic control	0	0	2	7	8	5	3	6	5	5
Outside Canada	74	100	89	79	78	69	78	66	83	55

Data extracted February 15, 2012.

Reportable incidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Reportable incidents include aeroplanes having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, and rotorcraft having a MCTOW greater than 2250 kg.

Breakdowns may not add up to totals. For example, in the total "Incidents by aircraft type", when an occurrence involves an airplane and a helicopter, the occurrence is counted in each category, but only once in the total.

\* "Number of aircraft involved in incidents" are aircraft counts, all other data are incident counts.

a. The commercial service type is not available for foreign-registered aircraft.

b. Other operator type contains, but is not limited to, organizations that rent aircraft (i.e., flying schools, flying clubs, etc.).

c. Includes balloons, gyroplanes, gliders, dirigibles, hang gliders and similar aircraft types.

**Table 11****Number of accidents involving aeroplanes by phase of flight and selected event category****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
<b>Standing/Taxiing</b>	<b>25</b>	<b>25</b>	<b>16</b>	<b>21</b>	<b>20</b>	<b>16</b>	<b>13</b>	<b>20</b>	<b>17</b>	<b>18</b>	<b>191</b>
Collision with object	7	9	5	8	8	6	6	9	6	6	70
Collision with moving aircraft	3	1	1	1	4	2	4	3	1	1	21
Nosedown/Overtaken	2	6	4	2	1	0	1	1	4	3	24
Landing gear collapsed/retracted	4	3	1	2	1	1	0	4	2	3	21
Loss of control	2	2	2	0	2	1	0	1	3	0	13
Other events	17	16	8	14	11	10	6	9	8	10	109
<b>Take-off</b>	<b>62</b>	<b>55</b>	<b>57</b>	<b>50</b>	<b>48</b>	<b>51</b>	<b>40</b>	<b>49</b>	<b>55</b>	<b>41</b>	<b>508</b>
Collision with terrain	22	20	11	22	18	10	10	14	16	10	153
Loss of control	16	18	16	18	14	12	7	15	15	11	142
Collision with object	15	13	16	11	18	17	14	16	14	10	144
Take-off/Landing event	18	12	21	10	10	16	5	13	13	14	132
Power loss	14	12	11	12	9	14	14	12	14	11	123
Other events	30	24	43	25	19	26	20	22	28	22	259
<b>En route</b>	<b>35</b>	<b>49</b>	<b>25</b>	<b>34</b>	<b>41</b>	<b>29</b>	<b>34</b>	<b>40</b>	<b>30</b>	<b>30</b>	<b>347</b>
Power loss	14	25	11	14	18	11	18	25	13	14	163
Precautionary/Forced landing/Ditching	10	15	6	8	6	6	14	9	11	13	98
Collision with terrain	11	8	6	8	16	6	5	10	7	7	84
Component/System related	6	9	4	7	5	9	4	8	6	5	63
Other events	21	22	13	14	21	15	13	18	18	15	170
<b>Manoeuvring</b>	<b>14</b>	<b>13</b>	<b>9</b>	<b>17</b>	<b>11</b>	<b>12</b>	<b>12</b>	<b>3</b>	<b>11</b>	<b>12</b>	<b>114</b>
Collision with terrain	5	7	2	10	4	8	3	2	5	6	52
Loss of control	5	4	4	3	1	5	3	1	3	1	30
Collision with object	2	4	3	2	4	2	4	0	7	2	30
Power loss	2	2	0	5	0	0	4	1	1	3	18
Other events	8	4	5	6	5	4	6	1	3	8	50
<b>Approach</b>	<b>27</b>	<b>35</b>	<b>32</b>	<b>31</b>	<b>25</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>28</b>	<b>22</b>	<b>287</b>
Collision with terrain	5	15	9	14	5	5	8	12	11	7	91
Power loss	5	6	5	9	9	6	8	7	7	2	64
Collision with object	8	8	4	5	4	9	8	3	6	8	63
Component/System related	5	3	8	5	3	6	6	9	2	5	52
Precautionary/Forced landing/Ditching	5	7	7	4	5	1	6	4	5	3	47
Loss of control	0	9	7	3	4	3	5	3	6	3	43
Other events	10	10	11	16	6	13	4	13	9	6	98
<b>Landing</b>	<b>113</b>	<b>148</b>	<b>133</b>	<b>105</b>	<b>116</b>	<b>149</b>	<b>114</b>	<b>121</b>	<b>112</b>	<b>113</b>	<b>1224</b>
Missed or went off runway	34	38	35	37	27	39	21	29	29	30	319
Collision with object	29	44	24	23	30	32	21	23	25	28	279
Landing gear collapsed/retracted	23	26	23	7	16	30	28	18	26	23	220
Nosedown/Overtaken	21	24	30	17	21	26	25	22	18	18	222
Loss of control	21	27	29	18	14	25	16	23	20	16	209
Hard landing	11	21	18	11	20	35	16	18	23	22	195
Collision with terrain	13	25	29	20	10	21	19	15	18	16	186
Wheels-up landing	11	11	14	6	5	12	8	12	7	3	89
Precautionary/Forced landing/Ditching	5	16	5	5	8	6	5	11	5	3	69
Other events	44	48	33	40	46	39	32	34	40	44	400
<b>Post-impact</b>	<b>17</b>	<b>20</b>	<b>18</b>	<b>20</b>	<b>12</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>20</b>	<b>10</b>	<b>155</b>
Fire/Explosion/Fumes	11	12	8	13	7	8	9	8	15	6	97
Other events	7	9	11	7	5	6	5	5	5	4	64

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns do not add up to totals. For example, in the "Take-off" phase, if an occurrence involves both "Control loss" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

**Table 12****Number of accidents involving helicopters by phase of flight and selected event category****2002-2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
<b>Standing/Taxiing</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>45</b>
Collision with terrain	2	1	1	1	2	1	0	1	0	2	11
Loss of control	2	1	0	1	2	1	1	0	0	2	10
Collision with object	1	0	0	1	1	3	1	0	0	0	7
Other events	3	2	7	8	5	2	2	3	0	5	37
<b>Take-off</b>	<b>9</b>	<b>5</b>	<b>7</b>	<b>10</b>	<b>11</b>	<b>7</b>	<b>7</b>	<b>4</b>	<b>2</b>	<b>6</b>	<b>68</b>
Loss of control	4	2	3	4	7	4	4	1	1	4	34
Collision with terrain	5	2	3	3	6	2	3	2	2	3	31
Collision with object	2	1	1	2	2	1	0	1	1	0	11
Power loss	2	1	0	1	2	0	1	1	0	1	9
Other events	5	2	5	5	5	4	6	1	1	1	35
<b>En route</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>7</b>	<b>10</b>	<b>92</b>
Collision with terrain	2	1	2	4	5	6	6	3	3	3	35
Power loss	2	3	3	2	6	4	4	5	3	2	34
Precautionary/Forced landing/Ditching	2	3	2	3	3	3	2	1	1	2	22
Component/System related	2	0	2	3	2	0	2	1	1	3	16
Other events	4	4	5	4	3	5	8	5	3	5	46
<b>Manoeuvring</b>	<b>16</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>9</b>	<b>7</b>	<b>9</b>	<b>9</b>	<b>114</b>
Collision with terrain	3	2	8	7	5	5	4	3	3	6	46
Loss of control	5	3	3	5	0	7	2	3	2	2	32
Collision with object	2	1	4	0	7	1	2	2	4	2	25
Operations related event	4	3	4	1	4	4	1	1	1	2	25
Power loss	5	6	3	1	0	2	2	2	2	0	23
Other events	9	6	5	4	8	7	5	5	4	1	54
<b>Approach</b>	<b>10</b>	<b>7</b>	<b>2</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>6</b>	<b>49</b>
Collision with terrain	1	0	2	2	1	1	2	3	4	1	17
Power loss	4	1	0	2	1	1	0	1	0	0	10
Loss of control	2	3	1	2	0	0	0	0	1	1	10
Collision with object	1	2	0	0	0	0	0	1	0	2	6
Other events	6	6	1	2	1	2	2	3	3	3	29
<b>Landing</b>	<b>31</b>	<b>24</b>	<b>15</b>	<b>19</b>	<b>21</b>	<b>16</b>	<b>17</b>	<b>15</b>	<b>15</b>	<b>7</b>	<b>180</b>
Hard landing	8	8	3	2	9	5	6	2	4	4	51
Collision with terrain	14	6	0	5	3	1	5	5	4	2	45
Loss of control	3	4	6	5	4	2	6	2	1	1	34
Collision with object	4	3	3	4	5	4	3	4	4	0	34
Other events	14	15	8	8	7	9	4	9	7	2	83
<b>Post-impact</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>46</b>
Fire/Explosion/Fumes	0	3	2	7	3	3	2	3	1	2	26
Other events	5	2	2	2	1	1	1	1	3	2	20

Data extracted February 15, 2012.

Accidents are reported in accordance with the TSB's regulations for mandatory reporting of occurrences.

Breakdowns do not add up to totals. For example, in the "Take-off" phase, if an occurrence involves both "Control loss" and "Power loss" events, the occurrence is counted in each event category, but only once in the phase total.

## APPENDIX B – DEFINITIONS

The following definitions apply to aviation occurrences that are required to be reported pursuant to the *Canadian Transportation Accident Investigation and Safety Board Act* and the associated regulations.

### *Aviation Occurrence*

- a) Any accident or incident associated with the operation of an aircraft; and
- b) Any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described in a) above.

### *Reportable Aviation Accident*

An accident resulting directly from the operation of an aircraft where

- a) a person sustains a serious injury or is killed as a result of
  - i) being on board the aircraft;
  - ii) coming into contact with any part of the aircraft or its contents; or
  - iii) being directly exposed to the jet blast or rotor downwash of the aircraft;
- b) the aircraft sustains damage that adversely affects the structural strength, performance or flight characteristics of the aircraft and that requires major repair or replacement of any affected component part; or
- c) the aircraft is missing or inaccessible.

### *Reportable Aviation Incident*

An incident resulting directly from the operation of an aeroplane having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, or from the operation of a rotorcraft having a MCTOW greater than 2250 kg, where

- a) an engine fails or is shut down as a precautionary measure;
- b) a transmission gearbox malfunction occurs;
- c) smoke or fire occurs;
- 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) any crew member whose duties are directly related to the safe operation of the aircraft is unable to perform the crew member's duties as a result of physical incapacitation that poses a threat to the safety of any person, property, or the environment;
- g) depressurization occurs that necessitates an emergency descent;
- h) a fuel shortage occurs that necessitates 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 collision, risk of collision, or loss of separation occurs;
- k) a crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic control unit 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.

### ***Serious Injury***

An injury that is sustained by a person in an accident and that

- a) requires hospitalization for more than 48 hours, commencing within seven days of the date the injury was received; or
- b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
- c) involves lacerations that cause severe haemorrhage or nerve, muscle or tendon damage; or
- d) involves injury to any internal organ; or
- e) involves second- or third-degree burns, or any burns affecting more than 5% of the body surface; or
- f) involves verified exposure to infectious substances or injurious radiation.

### ***ATS-Related Event***

Any event related to the provision of air traffic control services including, but not limited to, failure or inability to provide service, emergency handling, or loss of in-flight separation.

### ***Air Proximity Event***

A situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their positions and speed have been such that the safety of the aircraft involved may have been compromised.

### ***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 aeroplane 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 8618 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 aeroplane used by a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, in which the aircraft is:

- a) 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;
- b) a turbo-jet-powered aeroplane 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 aeroplane or helicopter used in aerial work involving

- a) the carriage on board of persons other than flight crew members;
- b) the carriage of helicopter external loads;
- c) the towing of objects; or
- d) 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) a single-engined aircraft;
- b) a multi-engined aircraft, other than a turbo-jet-powered aeroplane, that has a MCTOW of 8618 kg (19 000 pounds) or less and a seating configuration, excluding pilot seats, of nine or less; or
- c) any aircraft that is authorized by the Minister of Transport to be operated under Part VII, Subpart 3, Division 1 of the *Canadian Aviation Regulations* (CARs).

### ***State Operators***

State operators include the federal and provincial governments.

### ***Corporate Operators***

Corporate operators include companies flying for business reasons.

### ***Private Operators***

Private 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.