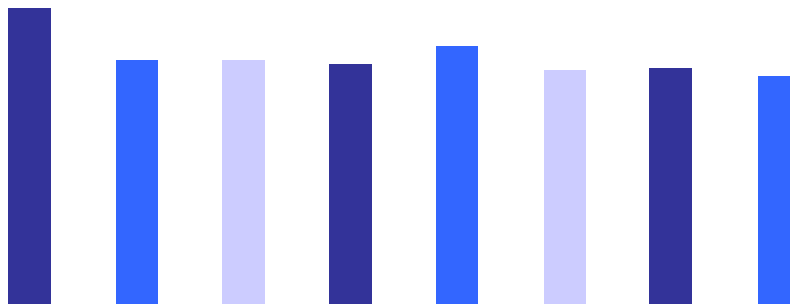




## Statistical Summary Aviation Occurrences 2010



## 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 2010 statistics presented here reflect the TSB database updated as of 21 July 2011.

To enhance awareness and increase the safety value of the material presented in the TSB *Statistical Summary, Aviation Occurrences 2010*, 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 2010

## ACCIDENTS

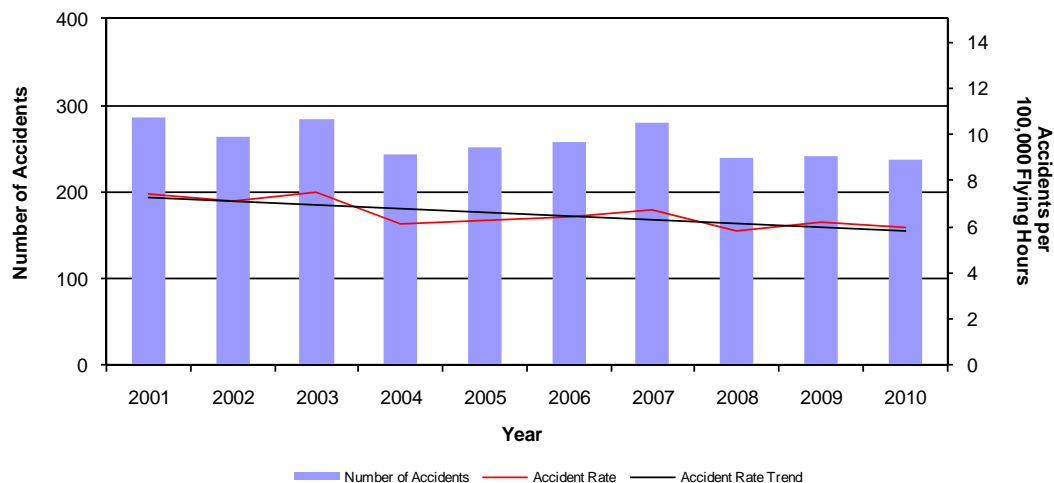
### *Overview of Accidents and Fatalities (Tables 1, 2, 3a, 3b and 6)*

In 2010, a total of 288 aviation accidents were reported to the TSB. Of this number, 244 involved Canadian-registered aircraft (excluding ultralights), a 2% decrease from 2009 (Figure 1).

Flying activity is unchanged from last year, and the accident rate for Canadian-registered aircraft has decreased from the 2009 accident rate of 6.2 accidents per 100 000 flying hours to 6.0. Statistical analysis using linear regression indicates a significant downward trend in accident rates ( $p < .01$ )<sup>1</sup> over the past 10 years.

The 244 accidents involving Canadian-registered aircraft (excluding ultralights) included 209 accidents involving aeroplanes<sup>2</sup> (57 accidents involved commercially operated aeroplanes) and 29 accidents involving helicopters. The remaining 6 accidents involved balloons, gliders or gyrocopters.

**Figure 1 – Accidents and Accident Rates,<sup>3</sup> 2001–2010**



<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,  $p < .05$ ).

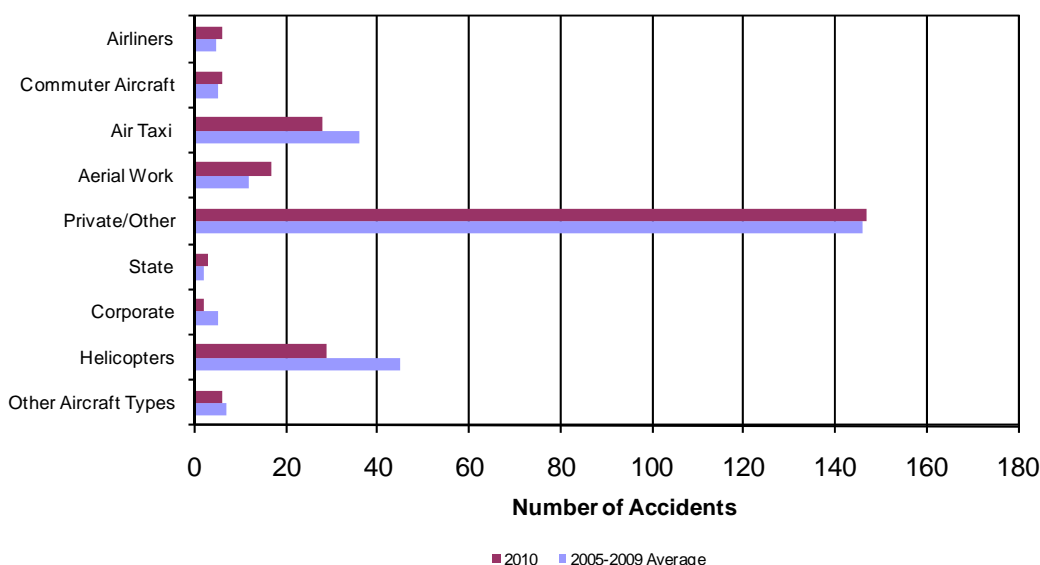
<sup>2</sup> As some occurrences involve more than one aircraft, users are cautioned to note differences between the number of occurrences and the number of aircraft involved in occurrences. All tables except Table 1 exclude ultralight aircraft; all tables except Tables 1 and 4 also exclude balloons,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

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

Of the 57 accidents involving commercial aeroplanes (6 airliners, 6 commuter aircraft, 28 air taxi and 17 aerial work) in 2010 (Figure 2), 7 fatal accidents involved air taxi aircraft, 4 fatal accidents involved aerial work, and one fatal accident involved a commuter aircraft. There were no fatal accidents involving airliners.

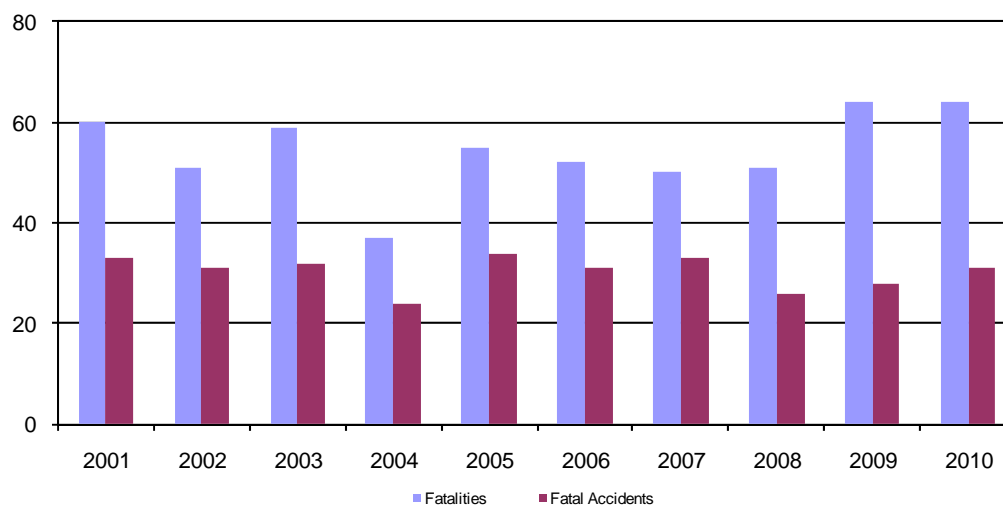
A total of 147 accidents involved private/ other aeroplanes, 1% higher than the five-year average of 146. In 2010, 15 such accidents resulted in fatalities, unchanged from 2009, but up one from the five-year average.

**Figure 2— Accidents Involving Canadian-Registered Aircraft, by Aircraft Type, 2010**



In 2010, 31 fatal accidents involved Canadian-registered aircraft other than ultralights (Figure 3), 8% higher than last year's total of 28 and slightly higher than the 2005-2009 average of 30. The number of fatalities (64) was higher than the five-year average (54), and the number of serious injuries (31) decreased from the five-year average (41). Passenger fatalities accounted for 43% of aircraft fatalities in 2010, and crew member fatalities accounted for 57% (excluding fatalities from ultralight accidents).

**Figure 3—Fatalities and Fatal Accidents, 2001-2010**



Three accidents involved aeroplanes operated by the state (that is, operated by federal or provincial governments) in 2010, with no fatalities.

In 2010, 29 accidents involved helicopters, yielding a 35% decrease from the five-year average of 45. Three of those accidents were fatal, resulting in 7 fatalities. Over the past 10 years, the highest proportion of helicopter accidents occurred during air transport operations (37%), training (11%), and pleasure/travel (11%).

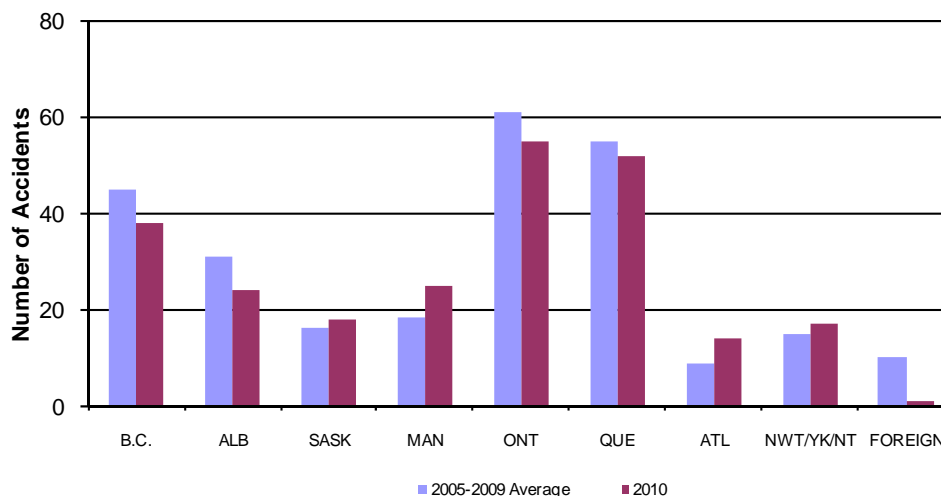
In 2010, 34 accidents in Canada involved ultralight aircraft, with 3 accidents resulting in 4 fatalities, which is a 33% decrease from the five-year average.

In 2010, 14 accidents involved foreign-registered aircraft in Canada, with 2 fatal accidents resulting in 2 fatalities.

### *Accidents by Selected Categories*

**Province (Table 8):** In 2010, Ontario and Quebec accounted for 25% and 23% respectively of Canadian-registered aircraft accidents, while British Columbia accounted for 16%. Canadian-registered aircraft accidents were lower than the five-year average in Ontario, British Columbia, Quebec, Alberta, Yukon, and Newfoundland and Labrador, and higher than the five-year average in Manitoba, Northwest Territories, Nunavut, Nova Scotia, and New Brunswick (Figure 4).

**Figure 4 – Accidents involving Canadian-Registered Aircraft, by Province, 2010**



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

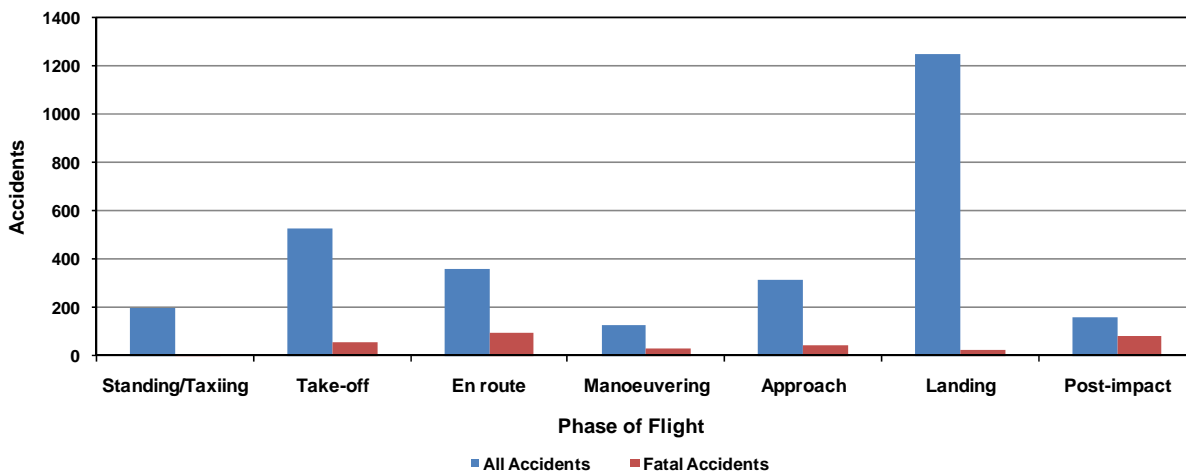
Accidents may be analysed in more detail by examining the nature and distribution of selected events contributing to an occurrence. Tables 11 and 12 show counts of accidents involving selected event types within each phase of flight.

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

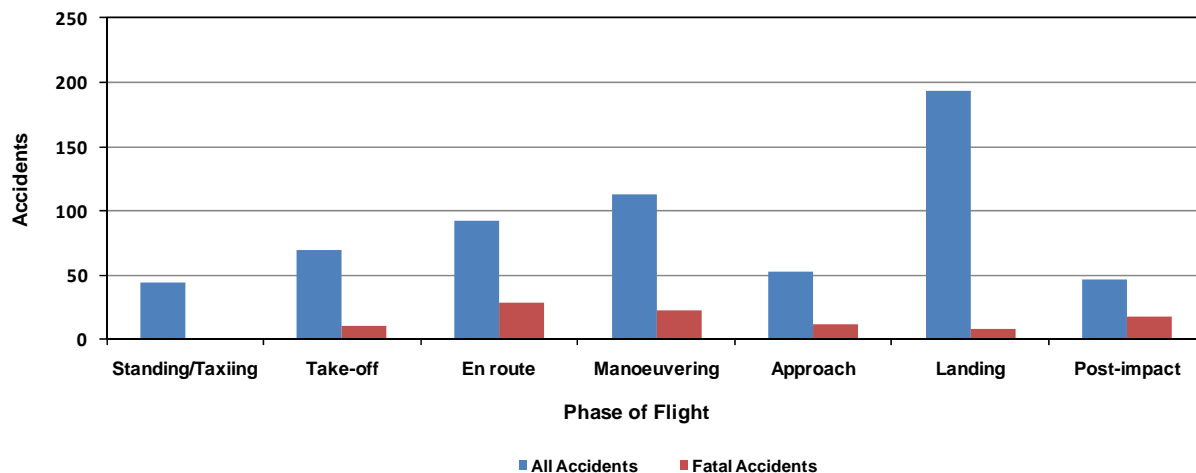
once in the phase total. In addition, approximately 5% of aeroplane accidents and 25% of helicopter accidents involve events in more than one phase of flight (not including "post-impact"), so the accidents shown in Figure 5 and Figure 6 sum to more than the total of accidents.

In 2010, the greatest numbers of aeroplane accidents were associated with landing (41%) and take-off (20%) phases of flight, followed by en route (11%) and approach (10%) phases. The greatest numbers of helicopter accidents were associated with landing (32%) and manoeuvring<sup>4</sup> (19%) phases of flight, followed by en route (15%) and take-off (11%) phases.

**Figure 5 - Aeroplane Accidents by Event Phase of Flight, 2001-2010**



**Figure 6 - Helicopter Accidents by Event Phase of Flight, 2001-2010**



From 2001 to 2010, of the 1252 aeroplane accidents with landing phase events, 26% involved missing or going off the runway, 23% involved collision with object, 19% involved landing gear collapse or retraction, and 18% involved a nosedown or overturning event. Of the 528 aeroplane accidents with take-off phase events, 32% involved collision with terrain, 29% involved loss of control, and 27% involved collision with object.

Collision with terrain was the predominant event in fatal aeroplane accidents from 2001 to 2010. Collision with terrain was involved in 65% of the 55 fatal aeroplane accidents with takeoff phase events, 61% of 96 fatal aeroplane accidents with en route phase events, 67% of 33 fatal aeroplane

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

accidents with manoeuvring phase events, 78% of 46 fatal aeroplane accidents with approach phase events, and 46% of 24 fatal aeroplane accidents with landing phase events.

From 2001 to 2010, of the 193 helicopter accidents with landing phase events, 28% involved a hard landing, 23% involved collision with terrain, 20% involved loss of control, and 20% involved a collision with object. Of the 113 helicopter accidents with manoeuvring phase events, 38% involved collision with terrain, 28% involved loss of control, and 23% involved collision with object.

Collision with terrain was also the predominant event in fatal helicopter accidents from 2001 to 2010. Collision with terrain was involved in 7 of 10 fatal helicopter accidents with takeoff phase events, 19 of 28 fatal helicopter accidents with en route phase events, 14 of 23 fatal helicopter accidents with manoeuvring phase events, 7 of 12 fatal helicopter accidents with approach phase events, and 5 of 8 fatal helicopter accidents with landing phase events.

**Operation Type (Table 6):** In 2010, aeroplane accidents occurred mainly on recreational flights (52%), followed by air transport (18%) and training flights (13%). Helicopter accidents occurred mainly on air transport flights (52%).

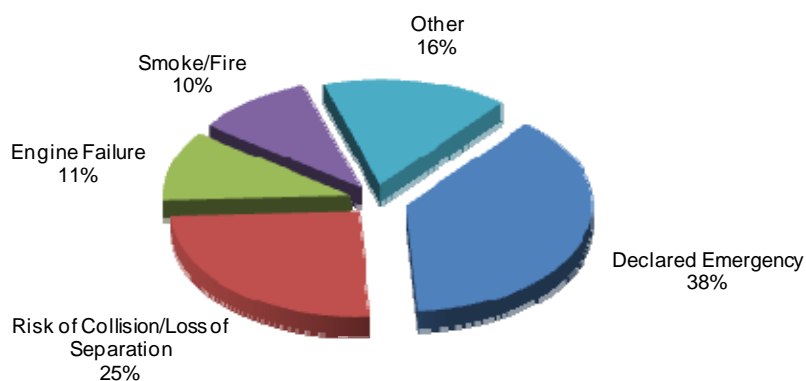
## INCIDENTS

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

Pursuant to TSB mandatory incident reporting requirements, 815 incidents were reported in 2010, 667 of which involved Canadian-registered aircraft.

In 2010, the most frequent incident types were declared emergency (38%), risk of collision or loss of separation (25%), and engine failure (11%) (Figure 7).

**Figure 7 – Reportable Incidents by Type, 2010**





# APPENDIX A – AVIATION OCCURRENCE TABLES

**Table 1**  
**Reportable Aviation Occurrences**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Accidents</b>	<b>359</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>324</b>	<b>294</b>	<b>297</b>	<b>288</b>
Accidents in Canada involving Canadian-registered aircraft	323	297	335	279	283	278	300	274	271	273
Accidents outside Canada involving Canadian-registered aircraft	7	12	7	9	7	11	14	7	11	1
Accidents in Canada involving foreign-registered aircraft	29	15	31	21	18	14	10	15	15	14
<b>Accidents by operator type</b>	<b>359</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>324</b>	<b>294</b>	<b>297</b>	<b>288</b>
Commercial	102	108	106	87	94	105	98	95	74	86
Airliner (705)	5	6	7	3	4	7	4	6	2	6
Commuter (704)	9	6	9	1	7	4	4	5	6	7
Air taxi (703)	54	57	45	58	56	63	53	64	44	44
Aerial work (702)	30	37	41	21	26	30	34	19	20	28
Foreign/Other commercial type (a)	4	2	4	4	2	1	4	2	2	1
State	5	5	8	4	2	4	2	5	4	5
Corporate	8	6	4	6	10	3	10	4	6	2
Private/Other operator type (b)	244	206	257	213	201	191	214	191	215	195
<b>Accidents by aircraft type</b>	<b>359</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>324</b>	<b>294</b>	<b>297</b>	<b>288</b>
Aeroplane	268	219	271	221	218	216	244	208	223	220
Helicopter	46	58	44	41	50	56	46	44	33	31
Ultralight	36	36	47	37	31	28	30	29	35	30
Other aircraft type (c)	11	12	11	9	8	4	5	13	7	7
<b>Number of aircraft involved in accidents*</b>	<b>364</b>	<b>327</b>	<b>376</b>	<b>314</b>	<b>314</b>	<b>311</b>	<b>328</b>	<b>300</b>	<b>303</b>	<b>290</b>
Aeroplanes	271	221	273	225	224	223	246	214	228	222
Helicopters	46	58	44	42	51	56	47	44	33	31
Ultralights	36	36	47	38	31	28	30	29	35	30
Other aircraft type(c)	11	12	12	9	8	4	5	13	7	7
<b>Fatal accidents by aircraft type</b>	<b>46</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>
Aeroplane	33	22	32	20	27	24	25	16	21	28
Helicopter	6	7	3	5	10	9	6	9	8	3
Ultralight	6	9	7	6	5	1	5	12	3	3
Other aircraft type (c)	3	4	3	2	2	0	2	1	1	2
<b>Fatalities</b>	<b>76</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>Serious injuries</b>	<b>48</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>Accidents in Canada involving foreign-registered aircraft</b>	<b>29</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>
Fatal accidents	8	2	6	3	6	2	0	0	2	2
Fatalities	10	4	8	10	10	2	0	0	2	2
Serious injuries	5	1	4	3	15	1	2	5	3	1
<b>Incidents (d)</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Incidents in Canada involving Canadian-registered aircraft	658	661	577	645	571	580	622	650	589	584
Incidents outside Canada involving Canadian-registered aircraft	64	71	100	89	79	78	69	78	67	83
Incidents in Canada involving foreign-registered aircraft	155	151	134	164	184	188	224	194	152	187
<b>Incidents by type (d)</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Risk of collision/Loss of separation	195	188	141	216	174	168	168	172	152	206
Declared emergency	249	279	279	264	222	260	298	314	311	309
Engine failure	170	151	122	134	139	130	129	120	106	87
Smoke/Fire	107	98	96	90	99	102	123	107	96	82
Collision	19	22	16	21	12	21	13	8	9	4
Other incident type	93	105	127	140	150	126	143	165	111	127

Data extracted July 21, 2011.

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**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Accidents by aircraft and operator type (a)</b>	<b>296</b>	<b>274</b>	<b>295</b>	<b>252</b>	<b>259</b>	<b>262</b>	<b>285</b>	<b>252</b>	<b>249</b>	<b>244</b>
Aeroplane accidents	241	208	240	203	203	202	235	197	210	209
Commercial	67	65	68	53	57	54	58	63	54	57
Airliner (705)	5	6	7	3	4	7	4	6	2	6
Commuter (704)	8	6	9	1	6	4	4	5	5	6
Air taxi (703)	36	41	35	41	33	30	39	41	36	28
Aerial work (702)	18	12	17	8	14	13	11	12	10	17
Other commercial type	0	0	0	0	0	0	0	0	1	0
State	3	3	3	2	1	4	1	3	2	3
Corporate	4	2	2	4	6	2	7	4	4	2
Private/Other operator type (b)	167	138	169	145	139	142	169	127	152	147
Helicopter accidents	46	56	44	40	49	56	45	42	32	29
Commercial	30	40	35	31	35	50	34	28	19	27
State	1	1	2	1	1	0	1	0	0	0
Corporate	1	2	0	0	0	0	3	0	1	0
Private/Other operator type (b)	14	13	7	8	13	6	7	14	12	2
Other aircraft type (c)	10	10	11	9	8	4	5	13	7	6
<b>Fatal accidents by aircraft and operator type (a)</b>	<b>33</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>
Aeroplane accidents	25	22	26	18	22	22	25	16	20	27
Commercial	7	6	8	3	9	6	7	3	5	12
Airliner (705)	0	0	0	0	0	0	0	0	0	0
Commuter (704)	1	0	0	0	1	0	1	0	0	1
Air taxi (703)	5	5	5	3	6	5	5	3	5	7
Aerial work (702)	1	1	3	0	2	1	1	0	0	4
Other commercial type	0	0	0	0	0	0	0	0	0	0
State	0	1	0	0	0	1	0	0	0	0
Corporate	1	0	0	0	0	0	1	2	0	0
Private/Other operator type (b)	17	15	18	15	13	15	17	11	15	15
Helicopter accidents	6	6	3	4	10	9	6	9	7	3
Other aircraft type (c)	3	3	3	2	2	0	2	1	1	1
<b>Fatalities (a)</b>	<b>60</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>Serious injuries (a)</b>	<b>35</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>Incidents by type (d)</b>	<b>722</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>728</b>	<b>656</b>	<b>667</b>
Risk of collision/Loss of separation	170	169	124	182	150	150	152	149	137	179
Declared emergency	208	231	229	204	152	184	186	235	236	238
Engine failure	157	134	104	118	116	106	108	98	93	67
Smoke/Fire	92	83	82	81	85	86	106	90	84	71
Collision	17	19	16	21	8	18	9	7	7	3
Other incident type	78	96	122	128	139	114	130	149	99	109
<b>Accidents involving ultralight aircraft</b>	<b>35</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>
Fatal accidents	6	9	7	6	5	1	5	12	3	3
Fatalities	8	12	9	10	6	1	6	13	4	4
Serious injuries	8	3	15	7	9	12	7	5	9	4

Data extracted July 21, 2011.

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)  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Accidents	286	264	284	243	251	258	280	239	242	238
Fatal accidents	30	28	29	22	32	31	31	25	27	30
Fatalities	57	48	56	35	52	52	47	50	63	63
Hours flown (thousands) (a)	3,885	3,713	3,790	3,961	3,979	4,059	4,180	4,144	3,921	3,980
Accidents per 100,000 hours	7.4	7.1	7.5	6.1	6.3	6.4	6.7	5.8	6.2	6.0
Fatal accidents per 100,000 hours	0.8	0.8	0.8	0.6	0.8	0.8	0.7	0.6	0.7	0.8
Fatalities per 100,000 hours	1.5	1.3	1.5	0.9	1.3	1.3	1.1	1.2	1.6	1.6

Data extracted July 21, 2011.

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 (2008 to 2010 hours flown are estimated).

**Table 3b****Aircraft Accident Rates in Canada (per Movements, Excluding Ultralights and Other Aircraft Types)  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Accidents	306	265	308	253	260	261	277	245	246	250
Fatal accidents	37	26	34	23	36	29	30	21	28	31
Fatalities	66	45	63	43	59	49	44	43	64	64
Aircraft movements (thousands) (a)	..	..	..	6,183	6,156	6,299	6,819	6,841	6,526	6,370
Accidents per 100,000 aircraft movements	..	..	..	4.1	4.2	4.1	4.1	3.6	3.8	3.9
Fatal accidents per 100,000 aircraft movements	..	..	..	0.4	0.6	0.5	0.4	0.3	0.4	0.5
Fatalities per 100,000 aircraft movements	..	..	..	0.7	1.0	0.8	0.7	0.6	1.0	1.0

Data extracted July 21, 2011.

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. (51-007-X, 51-008-X, 51-209-X and 51-210-X).

**Table 4**  
**Aircraft Accident Fatalities**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Fatalities</b>	<b>76</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>
Fatalities in Canada involving Canadian-registered aircraft	65	58	67	45	60	48	53	57	66	68
Fatalities outside Canada involving Canadian-registered aircraft	1	5	1	2	1	5	3	7	2	0
Fatalities in Canada involving foreign-registered aircraft	10	4	8	10	10	2	0	0	2	2
<b>Fatalities by operator type</b>	<b>76</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>
Commercial	22	16	21	25	26	28	19	25	36	36
Airliner (705)	0	0	0	0	0	0	0	0	0	0
Commuter (704)	2	0	0	0	2	0	1	0	17	1
Air taxi (703)	16	9	15	18	17	18	10	20	18	28
Aerial work (702)	3	5	6	0	7	10	9	5	1	7
Foreign/Other commercial type (a)	1	2	0	7	0	0	0	0	0	0
State	0	3	4	0	0	1	0	0	0	0
Corporate	5	0	0	0	1	0	1	7	0	0
Private/Other operator type (b)	49	48	51	32	42	26	36	32	34	34
<b>Crew fatalities by operator type</b>	<b>48</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>
Commercial	11	8	11	11	15	12	12	8	10	17
Airliner (705)	0	0	0	0	0	0	0	0	0	0
Commuter (704)	2	0	0	0	2	0	0	0	2	1
Air taxi (703)	6	2	5	4	9	5	7	6	7	11
Aerial work (702)	2	4	6	0	4	7	6	2	1	5
Foreign/Other commercial type (a)	1	2	0	7	0	0	0	0	0	0
State	0	3	1	0	0	1	0	0	0	0
Corporate	2	0	0	0	1	0	1	2	0	0
Private/Other operator type (b)	35	28	31	26	28	19	24	25	24	22
<b>Passenger fatalities by operator type</b>	<b>28</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>
Commercial	11	7	10	14	11	15	7	16	26	18
Airliner (705)	0	0	0	0	0	0	0	0	0	0
Commuter (704)	0	0	0	0	0	0	1	0	15	0
Air taxi (703)	10	7	10	14	8	12	3	14	11	16
Aerial work (702)	1	0	0	0	3	3	3	2	0	2
Foreign/Other commercial type (a)	0	0	0	0	0	0	0	0	0	0
State	0	0	3	0	0	0	0	0	0	0
Corporate	3	0	0	0	0	0	0	5	0	0
Private/Other operator type (b)	14	20	20	6	14	7	12	7	10	12
<b>Ground fatalities</b>	<b>0</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>Fatalities by aircraft type</b>	<b>76</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>
Aeroplane	59	41	58	40	45	42	39	34	38	57
Helicopter	9	9	6	5	15	12	8	16	27	7
Ultralight	8	12	9	10	6	1	6	13	4	4
Other aircraft type (c)	3	5	3	2	3	0	3	1	1	2

Data extracted July 21, 2011.

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**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Serious injuries</b>	<b>48</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>
Serious injuries in Canada involving Canadian-registered aircraft	41	41	55	34	45	51	61	45	42	35
Serious injuries outside Canada involving Canadian-registered aircraft	2	4	2	0	1	1	2	0	1	0
Serious injuries in Canada involving foreign-registered aircraft	5	1	4	3	15	1	2	5	3	1
<b>Serious injuries by operator type</b>	<b>48</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>
Commercial	21	20	20	14	24	20	30	24	11	15
Airliner (705)	3	0	1	0	1	1	0	1	1	1
Commuter (704)	1	1	7	0	0	0	1	2	1	4
Air taxi (703)	9	16	7	10	4	16	15	18	6	6
Aerial work (702)	4	3	5	2	7	2	14	3	3	4
Foreign/Other commercial type (a)	4	0	0	2	12	1	0	0	0	0
State	0	1	0	0	1	2	3	0	2	1
Corporate	0	1	0	0	4	0	1	0	3	0
Private/Other operator type (b)	27	24	41	23	33	31	31	26	30	20
<b>Crew serious injuries by operator type</b>	<b>27</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>
Commercial	7	7	12	8	11	9	10	11	5	6
Airliner (705)	1	0	0	0	1	1	0	0	0	0
Commuter (704)	0	0	3	0	0	0	1	0	0	1
Air taxi (703)	3	5	4	4	2	6	3	9	2	2
Aerial work (702)	3	2	5	2	6	2	6	2	3	3
Foreign/Other commercial type (a)	0	0	0	2	2	0	0	0	0	0
State	0	1	0	0	1	1	1	0	1	1
Corporate	0	1	0	0	2	0	0	0	2	0
Private/Other operator type (b)	20	19	29	18	23	18	19	14	19	15
<b>Passenger serious injuries by operator type</b>	<b>20</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>12</b>
Commercial	13	11	7	5	11	10	20	13	6	9
Airliner (705)	2	0	0	0	0	0	0	1	1	1
Commuter (704)	1	1	4	0	0	0	0	2	1	3
Air taxi (703)	6	9	3	5	1	9	12	9	4	4
Aerial work (702)	1	1	0	0	0	0	8	1	0	1
Foreign/Other commercial type (a)	3	0	0	0	10	1	0	0	0	0
State	0	0	0	0	0	1	2	0	1	0
Corporate	0	0	0	0	1	0	1	0	1	0
Private/Other operator type (b)	7	5	9	4	10	12	9	12	11	3
<b>Ground serious injuries</b>	<b>1</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>2</b>
<b>Serious injuries by aircraft type</b>	<b>48</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>
Aeroplane	31	32	38	20	41	28	32	29	24	29
Helicopter	6	8	7	6	10	9	13	14	11	2
Ultralight	8	3	15	8	9	12	7	5	9	4
Other aircraft type (c)	3	3	1	3	2	4	13	2	2	1

Data extracted July 21, 2011.

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  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Aeroplane accidents by operation type</b>	<b>241</b>	<b>208</b>	<b>240</b>	<b>203</b>	<b>203</b>	<b>202</b>	<b>235</b>	<b>197</b>	<b>210</b>	<b>209</b>
Training	46	20	34	25	16	33	33	30	43	28
Pleasure/Travel	108	102	122	118	116	95	119	83	109	108
Business	10	6	8	4	6	8	15	7	4	6
Forest fire management	2	2	2	3	2	4	0	1	3	2
Test/Demonstration/Ferry	7	6	5	7	5	6	8	4	0	6
Aerial application	13	6	13	3	6	8	8	9	4	10
Inspection	1	4	1	0	1	1	0	1	1	1
Air transport	43	49	42	35	35	37	40	46	34	37
Air ambulance	3	2	1	2	1	3	2	3	5	2
Sightseeing	1	1	4	0	2	3	1	2	2	1
Other/Unknown	9	10	10	6	14	6	9	11	8	9
<b>Aeroplane fatal accidents by operation type</b>	<b>25</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>
Training	2	1	3	4	0	4	3	0	1	1
Pleasure/Travel	10	11	15	10	12	11	10	8	13	14
Business	4	0	0	0	0	1	1	2	1	1
Forest fire management	1	0	1	0	0	0	0	0	0	2
Test/Demonstration/Ferry	2	2	0	0	1	1	4	1	0	0
Aerial application	0	0	1	0	0	0	1	1	0	0
Inspection	0	2	0	0	0	0	0	0	0	0
Air transport	4	5	4	3	7	5	4	3	4	7
Air ambulance	1	0	0	0	0	0	1	0	1	0
Sightseeing	0	1	0	0	0	0	1	0	0	0
Other/Unknown	1	0	2	1	2	1	0	1	0	2
<b>Helicopter accidents by operation type</b>	<b>46</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>
Training	11	9	6	4	3	2	3	6	5	0
Pleasure/Travel	4	2	1	5	11	4	4	9	5	2
Business	4	6	1	0	1	0	4	0	3	0
Forest fire management	2	6	6	4	1	3	0	0	4	1
Test/Demonstration/Ferry	1	5	0	2	0	2	3	0	0	1
Aerial application	1	1	2	1	2	0	2	1	0	3
Inspection	0	1	4	2	0	1	1	0	0	1
Air transport	12	14	11	15	19	29	16	22	10	15
Air ambulance	1	0	0	0	1	0	0	1	0	0
Sightseeing	0	0	0	0	0	0	0	0	1	0
Other/Unknown	10	12	13	7	11	15	13	3	4	6
<b>Fatal helicopter accidents by operation type</b>	<b>6</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>
Training	1	0	0	0	0	0	0	0	1	0
Pleasure/Travel	2	0	0	1	5	0	0	3	2	0
Business	0	1	0	0	1	0	1	0	0	0
Forest fire management	0	0	1	0	0	2	0	0	1	0
Test/Demonstration/Ferry	1	2	0	0	0	1	0	0	0	1
Aerial application	0	0	0	0	0	0	0	0	0	0
Inspection	0	0	0	1	0	0	1	0	0	0
Air transport	1	0	0	2	3	2	3	4	3	2
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	1	3	2	0	1	4	2	2	0	0

Data extracted July 21, 2011.

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**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Accidents by province/territory</b>	<b>359</b>	<b>324</b>	<b>373</b>	<b>308</b>	<b>306</b>	<b>303</b>	<b>324</b>	<b>294</b>	<b>297</b>	<b>288</b>
Newfoundland and Labrador	13	7	12	5	5	4	6	7	3	3
Prince Edward Island	2	0	2	0	1	0	0	0	1	0
Nova Scotia	3	9	1	5	0	2	4	6	3	7
New Brunswick	4	2	1	8	6	3	8	1	2	5
Quebec	59	49	67	55	64	56	72	58	68	65
Ontario	86	93	115	92	73	60	81	69	74	71
Manitoba	30	20	32	12	19	21	18	27	19	27
Saskatchewan	23	18	20	13	15	19	23	19	14	18
Alberta	43	50	40	33	34	44	32	33	31	25
British Columbia	66	53	65	60	70	64	46	44	59	47
Yukon	7	5	6	7	5	4	7	7	4	3
Northwest Territories	13	4	5	7	5	6	9	8	6	9
Nunavut	2	2	0	2	2	7	4	8	2	7
Other air space under Canadian air traffic control	0	0	0	0	0	2	0	0	0	0
Outside Canada	8	12	7	9	7	11	14	7	11	1
<b>Fatal accidents by province/territory</b>	<b>46</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>
Newfoundland and Labrador	3	1	3	1	1	0	1	0	2	1
Prince Edward Island	0	0	0	0	0	0	0	0	1	0
Nova Scotia	0	3	0	2	0	0	1	0	0	1
New Brunswick	0	0	0	0	1	1	0	0	0	2
Quebec	6	7	10	6	10	4	6	5	9	9
Ontario	10	10	14	6	7	4	6	7	6	9
Manitoba	2	1	0	2	2	0	3	1	0	1
Saskatchewan	1	2	1	2	1	4	5	0	2	0
Alberta	3	2	5	2	5	6	3	8	1	2
British Columbia	13	13	10	8	16	9	10	10	8	7
Yukon	3	0	1	0	0	1	1	1	1	0
Northwest Territories	3	0	0	1	0	1	1	2	1	3
Nunavut	1	0	0	1	0	0	0	0	0	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	1	3	1	2	1	4	1	4	2	0
<b>Fatalities by province/territory</b>	<b>76</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>
Newfoundland and Labrador	5	2	5	1	2	0	1	0	18	2
Prince Edward Island	0	0	0	0	0	0	0	0	1	0
Nova Scotia	0	3	0	8	0	0	1	0	0	2
New Brunswick	0	0	0	0	1	1	0	0	0	2
Quebec	12	15	15	7	14	7	7	7	15	26
Ontario	12	14	30	22	11	6	7	8	12	14
Manitoba	4	1	0	2	2	0	5	1	0	1
Saskatchewan	1	2	1	2	2	4	6	0	4	0
Alberta	5	3	7	2	8	9	5	12	1	4
British Columbia	20	22	16	8	28	16	17	26	14	15
Yukon	5	0	1	0	0	1	1	1	1	0
Northwest Territories	8	0	0	2	0	6	3	2	2	3
Nunavut	3	0	0	1	0	0	0	0	0	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	1	5	1	2	1	5	3	7	2	0

Data extracted July 21, 2011.

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)****2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Accidents by province/territory</b>	<b>296</b>	<b>274</b>	<b>295</b>	<b>252</b>	<b>259</b>	<b>262</b>	<b>285</b>	<b>252</b>	<b>249</b>	<b>244</b>
Newfoundland and Labrador	10	6	9	5	5	3	5	5	3	3
Prince Edward Island	1	0	1	0	1	0	0	0	1	0
Nova Scotia	3	7	1	3	0	0	3	2	1	7
New Brunswick	4	2	1	5	5	2	7	1	2	4
Quebec	48	42	55	44	56	48	61	50	60	52
Ontario	64	74	80	71	57	52	71	62	61	55
Manitoba	28	17	28	12	18	17	17	24	19	25
Saskatchewan	18	18	16	13	13	18	21	18	12	18
Alberta	36	46	34	29	28	41	31	28	28	24
British Columbia	58	41	54	46	59	53	36	33	44	38
Yukon	4	4	4	6	3	4	6	7	2	3
Northwest Territories	12	4	5	7	5	6	9	8	5	8
Nunavut	2	1	0	2	2	7	4	7	1	6
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	8	12	7	9	7	11	14	7	10	1
<b>Fatal accidents by province/territory</b>	<b>33</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>
Newfoundland and Labrador	1	1	2	1	1	0	1	0	2	1
Prince Edward Island	0	0	0	0	0	0	0	0	1	0
Nova Scotia	0	2	0	1	0	0	0	0	0	1
New Brunswick	0	0	0	0	1	0	0	0	0	2
Quebec	6	6	5	4	9	3	4	4	8	8
Ontario	6	5	11	2	6	4	6	4	5	8
Manitoba	2	1	0	2	2	0	3	1	0	1
Saskatchewan	0	2	1	2	0	3	4	0	1	0
Alberta	2	2	3	2	2	6	3	4	1	2
British Columbia	11	9	8	6	12	9	9	6	8	5
Yukon	0	0	1	0	0	1	1	1	0	0
Northwest Territories	3	0	0	1	0	1	1	2	1	2
Nunavut	1	0	0	1	0	0	0	0	0	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	1	3	1	2	1	4	1	4	1	0
<b>Fatalities by province/territory</b>	<b>60</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>
Newfoundland and Labrador	3	2	3	1	2	0	1	0	18	2
Prince Edward Island	0	0	0	0	0	0	0	0	1	0
Nova Scotia	0	2	0	1	0	0	0	0	0	2
New Brunswick	0	0	0	0	1	0	0	0	0	2
Quebec	12	14	9	4	12	6	5	6	14	25
Ontario	8	6	27	14	10	6	7	4	11	12
Manitoba	4	1	0	2	2	0	5	1	0	1
Saskatchewan	0	2	1	2	0	3	5	0	2	0
Alberta	4	3	4	2	4	9	5	8	1	4
British Columbia	17	16	13	6	23	16	15	22	14	13
Yukon	0	0	1	0	0	1	1	1	0	0
Northwest Territories	8	0	0	2	0	6	3	2	2	2
Nunavut	3	0	0	1	0	0	0	0	0	1
Other air space under Canadian air traffic control	0	0	0	0	0	0	0	0	0	0
Outside Canada	1	5	1	2	1	5	3	7	1	0

Data extracted July 21, 2011.

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



**Table 9**  
**Reportable Aircraft Incidents**  
**2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Incidents by type</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Risk of collision/Loss of separation	195	188	141	216	174	168	168	172	152	206
Declared emergency	249	279	279	264	222	260	298	314	311	309
Engine failure	170	151	122	134	139	130	129	120	106	87
Smoke/Fire	107	98	96	90	99	102	123	107	96	82
Collision	19	22	16	21	12	21	13	8	9	4
Control difficulties	32	31	41	43	44	41	41	39	24	32
Crew unable to perform duties	15	38	49	55	67	57	65	77	59	50
Dangerous goods-related	6	1	2	0	1	2	3	1	3	1
Depressurization	20	18	21	9	14	9	13	17	6	11
Fuel shortage	2	3	6	13	10	6	8	7	4	9
Failure to remain in landing area	7	8	3	11	11	7	9	18	9	14
Incorrect fuel	0	1	0	2	1	1	0	1	0	0
Slung load released	8	3	4	5	1	3	3	5	3	9
Transmission or gearbox failure	3	2	1	2	1	0	1	0	3	1
<b>Incidents by operator type</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Commercial	784	774	736	819	732	772	823	856	746	776
Airliner (705)	579	560	524	578	488	528	563	589	498	519
Commuter (704)	89	84	68	91	89	80	75	94	87	85
Air taxi (703)	27	42	34	37	39	51	25	36	43	32
Aerial work (702)	19	18	33	38	22	20	20	24	31	26
Foreign/Other commercial type (a)	128	126	121	144	151	165	196	180	135	169
State	38	33	26	29	28	21	29	17	22	26
Corporate	32	47	33	34	45	30	43	21	29	20
Private/Other operator type (b)	31	46	19	37	40	32	24	34	27	32
<b>Incidents by aircraft type</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Aeroplane	811	822	757	845	779	787	854	869	767	790
Helicopter	26	23	30	28	20	29	22	19	21	33
Ultralight/Other aircraft type (c)	0	1	0	0	1	1	0	0	1	1
<b>Number of aircraft involved in incidents*</b>	<b>1003</b>	<b>1010</b>	<b>906</b>	<b>1038</b>	<b>956</b>	<b>974</b>	<b>1031</b>	<b>1051</b>	<b>910</b>	<b>979</b>
Aeroplanes	976	985	875	1008	935	942	1009	1032	887	945
Helicopters	27	24	31	30	20	30	22	19	22	33
Ultralight/Other aircraft type (c)	0	1	0	0	1	2	0	0	1	1
<b>Incidents by province/territory</b>	<b>833</b>	<b>843</b>	<b>781</b>	<b>865</b>	<b>796</b>	<b>807</b>	<b>874</b>	<b>886</b>	<b>785</b>	<b>815</b>
Newfoundland and Labrador	38	25	16	19	25	24	19	21	16	30
Prince Edward Island	3	1	1	2	1	2	1	2	2	0
Nova Scotia	24	13	18	23	14	17	26	20	18	25
New Brunswick	16	9	5	10	11	14	17	12	5	10
Quebec	90	87	104	85	123	101	127	127	97	109
Ontario	236	317	240	248	220	244	264	273	194	176
Manitoba	42	42	46	53	39	43	52	59	46	51
Saskatchewan	34	24	23	22	14	20	19	28	18	19
Alberta	106	95	99	118	108	111	79	89	106	84
British Columbia	125	110	99	142	93	83	133	120	162	156
Yukon	8	6	3	4	3	4	4	4	6	4
Northwest Territories	26	22	18	29	28	26	29	27	14	23
Nunavut	12	9	8	11	15	10	12	16	8	20
Other air space under Canadian air traffic control	1	0	0	10	23	30	23	10	26	25
Outside Canada	72	83	101	89	79	78	69	78	67	83

Data extracted July 21, 2011.

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  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Incidents by type</b>	<b>722</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>728</b>	<b>656</b>	<b>667</b>
Risk of collision/Loss of separation	170	169	124	182	150	150	152	149	137	179
Declared emergency	208	231	229	204	152	184	186	235	236	238
Engine failure	157	134	104	118	116	106	108	98	93	67
Smoke/Fire	92	83	82	81	85	86	106	90	84	71
Collision	17	19	16	21	8	18	9	7	7	3
Control difficulties	28	28	41	41	41	31	38	32	18	24
Crew unable to perform duties	13	37	48	51	67	56	63	75	57	49
Dangerous goods-related	6	0	2	0	1	2	3	1	3	1
Depressurization	15	18	17	7	12	9	11	15	3	10
Fuel shortage	2	1	6	10	5	6	4	4	4	6
Failure to remain in landing area	4	6	3	10	10	6	7	16	8	9
Incorrect fuel	0	1	0	2	1	1	0	1	0	0
Slung load released	8	3	4	5	1	3	3	5	3	9
Transmission or gearbox failure	2	2	1	2	1	0	1	0	3	1
<b>Incidents by operator type</b>	<b>722</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>728</b>	<b>656</b>	<b>667</b>
Commercial	686	677	636	700	604	634	660	703	625	637
Airliner (705)	578	560	520	578	487	524	563	585	494	518
Commuter (704)	89	84	68	91	89	79	75	94	87	85
Air taxi (703)	27	42	34	37	39	51	25	36	43	31
Aerial work (702)	19	18	33	38	22	20	17	24	30	26
Other commercial type (a)	31	29	25	25	24	31	36	31	19	31
State	32	29	26	27	25	20	28	16	20	22
Corporate	24	37	29	26	29	21	23	17	21	17
Private/Other operator type (b)	29	41	16	31	34	28	22	32	26	29
<b>Incidents by aircraft type</b>	<b>722</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>728</b>	<b>656</b>	<b>667</b>
Aeroplane	701	712	653	715	633	638	673	711	638	643
Helicopter	25	23	30	27	20	29	20	19	21	32
Ultralight/Other aircraft type (c)	0	0	0	0	1	1	0	0	1	1
<b>Number of aircraft involved in incidents*</b>	<b>869</b>	<b>886</b>	<b>786</b>	<b>886</b>	<b>785</b>	<b>803</b>	<b>833</b>	<b>873</b>	<b>772</b>	<b>813</b>
Aeroplanes	843	862	755	857	764	771	813	854	749	780
Helicopters	26	24	31	29	20	30	20	19	22	32
Ultralight/Other aircraft type (c)	0	0	0	0	1	2	0	0	1	1
<b>Incidents by province/territory</b>	<b>722</b>	<b>732</b>	<b>677</b>	<b>734</b>	<b>650</b>	<b>658</b>	<b>691</b>	<b>728</b>	<b>656</b>	<b>667</b>
Newfoundland and Labrador	25	15	9	10	14	13	10	13	7	13
Prince Edward Island	2	1	1	1	0	2	0	1	1	0
Nova Scotia	22	9	12	18	7	12	17	12	13	19
New Brunswick	14	7	3	10	7	9	12	7	3	8
Quebec	75	73	85	66	98	79	90	96	77	90
Ontario	210	276	205	211	175	198	202	222	167	141
Manitoba	34	38	40	43	31	35	43	49	40	45
Saskatchewan	30	20	18	19	11	19	16	26	16	15
Alberta	97	88	88	105	95	99	67	76	92	74
British Columbia	109	97	87	122	85	72	120	103	141	134
Yukon	6	5	3	2	2	2	4	2	6	3
Northwest Territories	23	21	18	28	26	22	29	27	14	21
Nunavut	8	8	8	8	13	10	7	13	7	16
Other air space under Canadian air traffic control	0	0	0	2	7	8	5	3	5	5
Outside Canada	67	74	100	89	79	78	69	78	67	83

Data extracted July 21, 2011.

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  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>Standing/Taxiing</b>	<b>22</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>195</b>
Collision with object	7	7	9	5	8	8	6	6	9	6	71
Collision with moving aircraft	2	3	1	1	1	4	2	4	3	1	22
Nosedown/Overturned	0	2	6	4	2	1	0	1	1	4	21
Landing gear collapsed/retracted	2	4	3	1	2	1	1	0	4	2	20
Loss of control	3	2	2	2	0	2	1	0	1	3	16
Other events	18	17	16	8	14	11	10	6	9	8	117
<b>Take-off</b>	<b>60</b>	<b>62</b>	<b>55</b>	<b>57</b>	<b>50</b>	<b>48</b>	<b>52</b>	<b>40</b>	<b>49</b>	<b>55</b>	<b>528</b>
Collision with terrain	28	22	20	11	22	18	10	10	14	16	171
Loss of control	19	16	18	16	18	14	13	7	15	15	151
Collision with object	11	15	13	16	11	18	17	14	16	14	145
Take-off/Landing event	11	18	12	21	10	10	17	5	13	13	130
Power loss	16	14	12	11	12	9	14	14	12	14	128
Other events	28	30	24	43	25	19	26	20	22	28	265
<b>En route</b>	<b>42</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>359</b>
Power loss	18	14	25	11	14	18	11	18	25	13	167
Precautionary/Forced landing/Ditching	11	10	15	6	8	6	6	14	9	11	96
Collision with terrain	12	11	8	6	8	16	6	5	10	7	89
Component/System related	5	6	9	4	7	5	9	4	8	6	63
Other events	24	21	22	13	14	21	15	13	18	18	179
<b>Manoeuvring (a)</b>	<b>25</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>127</b>
Collision with terrain	11	5	7	2	10	4	8	3	2	5	57
Loss of control	10	5	4	4	3	1	5	3	1	3	39
Collision with object	3	2	4	3	2	4	2	4	0	7	31
Power loss	7	2	2	0	5	0	0	4	1	1	22
Other events	14	8	4	5	6	5	4	6	1	3	56
<b>Approach</b>	<b>46</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>311</b>
Collision with terrain	15	5	15	9	14	5	5	8	12	11	99
Power loss	7	5	6	5	9	9	6	8	7	7	69
Collision with object	8	8	8	4	5	4	9	8	3	6	63
Component/System related	13	5	3	8	5	3	6	6	9	2	60
Precautionary/Forced landing/Ditching	4	5	7	7	4	5	1	6	4	5	48
Loss of control	7	0	9	7	3	4	3	5	3	6	47
Other events	22	10	10	11	16	6	13	4	13	9	114
<b>Landing</b>	<b>141</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>1252</b>
Missed or went off runway	33	34	38	35	37	27	39	21	29	29	322
Collision with object	32	29	44	24	23	30	32	21	23	25	283
Landing gear collapsed/retracted	39	23	26	23	7	16	30	28	18	26	236
Nosedown/Overturned	24	21	24	30	17	21	26	25	22	18	228
Loss of control	23	21	27	29	18	14	25	16	23	20	216
Hard landing	23	11	21	18	11	20	35	16	18	23	196
Collision with terrain	22	13	25	29	20	10	21	19	15	18	192
Wheels-up landing	10	11	11	14	6	5	12	8	12	7	96
Precautionary/Forced landing/Ditching	7	5	16	5	5	8	6	5	11	5	73
Other events	49	44	48	33	40	46	39	32	34	40	405
<b>Post-impact</b>	<b>17</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>162</b>
Fire/Explosion/Fumes	10	11	12	8	13	7	8	9	8	15	101
Other events	7	7	9	11	7	5	6	5	5	5	67

Data extracted July 21, 2011.

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.

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

**Table 12****Number of Accidents Involving Helicopters by Phase of Flight and Selected Event Category  
2001-2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>Standing/Taxiing</b>	<b>5</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>44</b>
Collision with terrain	2	2	1	1	1	2	1	0	1	0	11
Loss of control	1	2	1	0	1	2	1	1	0	0	9
Collision with object	1	1	0	0	1	1	3	1	0	0	8
Other events	4	3	2	7	8	5	2	2	3	0	36
<b>Take-off</b>	<b>7</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>69</b>
Loss of control	2	4	2	3	4	7	4	4	1	1	32
Collision with terrain	2	5	2	3	3	6	2	3	2	2	30
Collision with object	3	2	1	1	2	2	1	0	1	1	14
Power loss	1	2	1	0	1	2	0	1	1	0	9
Other events	3	5	2	5	5	5	4	6	1	1	37
<b>En route</b>	<b>10</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>92</b>
Collision with terrain	4	2	1	2	4	5	6	6	3	3	36
Power loss	1	2	3	3	2	6	4	4	5	3	33
Precautionary/Forced landing/Ditching	4	2	3	2	3	3	3	2	1	1	24
Component/System related	3	2	0	2	3	2	0	2	1	1	16
Other events	6	4	4	5	4	3	5	8	5	2	46
<b>Manoeuvring (a)</b>	<b>8</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>113</b>
Collision with terrain	3	3	2	8	7	5	5	4	3	3	43
Loss of control	2	5	3	3	5	0	7	2	3	2	32
Collision with object	3	2	1	4	0	7	1	2	2	4	26
Operations related event	2	4	3	4	1	4	4	1	1	1	25
Power loss	2	5	6	3	1	0	2	2	2	2	25
Other events	6	9	6	5	4	8	7	5	5	4	59
<b>Approach</b>	<b>9</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>52</b>
Collision with terrain	3	1	0	2	2	1	1	2	3	4	19
Power loss	5	4	1	0	2	1	1	0	1	0	15
Loss of control	3	2	3	1	2	0	0	0	0	1	12
Collision with object	2	1	2	0	0	0	0	0	1	0	6
Other events	3	6	6	1	2	1	2	2	3	3	29
<b>Landing</b>	<b>20</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>193</b>
Hard landing	7	8	8	3	2	9	5	6	2	4	54
Collision with terrain	2	14	6	0	5	3	1	5	5	4	45
Loss of control	6	3	4	6	5	4	2	6	2	1	39
Collision with object	5	4	3	3	4	5	4	3	4	4	39
Other events	11	14	15	8	8	7	9	4	9	7	92
<b>Post-impact</b>	<b>5</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>47</b>
Fire/Explosion/Fumes	1	0	3	2	7	3	3	2	3	1	25
Other events	4	5	2	2	2	1	1	1	1	3	22

Data extracted July 21, 2011.

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.

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

## 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.