U.S. Helicopter Fatal Accidents Decrease Again

Multi-engine turbine helicopter operations in 2007 had the best safety record.

BY RICK DARBY

Fatal accident rates in U.S. civil helicopter operations continued a five-year improvement trend in 2007, as did the rates of fatalities and serious injuries, according to data from Helicopter Association International.[1] The corresponding overall accident rate was higher than in 2006, although it remained lower than that of 2003 through 2005.

The 2007 fatal accident rate of 0.64 per 100,000 flight hours was a 16 percent decrease

U.S. Civil Helicopter Safety Trends, 2003–2007

	2007	2006	2005	2004	2003
Total number of civil helicopter accidents	178	162	193	180	214
Total number of fatal helicopter accidents	22	25	26	33	37
Total number of fatalities	43	43	44	68	67
Total number of serious injuries	35	34	44	38	51
Total number of minor injuries	55	64	74	68	83
Accidents per 100,000 flight hours	5.15	4.94	6.32	7.10	10.02
Fatal accidents per 100,000 flight hours	0.64	0.76	0.85	1.30	1.73
Fatalities per 100,000 flight hours	1.25	1.31	1.44	2.68	3.14
Serious injuries per 100,000 flight hours	1.01	1.04	1.44	1.50	2.39
Minor injuries per 100,000 flight hours	1.59	1.95	2.42	2.68	3.89

Note: U.S. National Transportation Safety Board (NTSB) preliminary accident reports include two helicopter collisions counted as one accident each. NTSB data are preliminary as of Feb. 11, 2008.

Source: Helicopter Association International

Table 1

from the 2006 rate of 0.76 and 63 percent lower than the 2003 rate of 1.73 (Table 1). The fatality rate of 1.25 per 100,000 flight hours was a 5 percent improvement on 2006's rate of 1.31. The serious injuries rate, at 1.01 per 100,000 flight hours, was 3 percent less than that of 2006 and 58 percent below the 2003 rate of 2.39.

Overall accidents rose to 5.15 per 100,000 flight hours from 4.94, a 4 percent increase, but 49 percent below the 10.02 rate in 2003.

U.S. Civil Helicopter Accident Rates, 2003–2007

	2007	2006	2005	2004	2003
Accidents per 100,000 flight hours					
Single-engine turbine	3.67	3.33	3.94	5.15	6.56
Multi-engine turbine	1.53	2.22	2.79	2.18	4.74
Reciprocating	11.72	11.26	16.86	17.70	24.77
Fatal accidents per 100,000 flight hours					
Single-engine turbine	0.66	1.42	0.82	1.19	1.34
Multi-engine turbine	0.15	0.63	0.66	0.59	1.18
Reciprocating	0.96	1.72	0.97	2.33	3.34
Fatalities per 100,000 flight hours					
Single-engine turbine	1.17	0.74	1.42	2.38	3.00
Multi-engine turbine	0.61	1.11	1.15	2.97	1.90
Reciprocating	1.91	2.91	1.46	3.31	4.69

Note: U.S. National Transportation Safety Board (NTSB) preliminary accident reports include two helicopter collisions counted as one accident each. NTSB data are preliminary as of Feb. 11, 2008.

Source: Helicopter Association International

Table 2

Rates for accidents, fatal accidents and fatalities were lowest in the multi-engine turbine category (Table 2). For all accidents, the 2007 rate of 1.53 per 100,000 flight hours for multi-engine turbine helicopters compared with 3.67 for single-engine turbine helicopters, or 58 percent lower. The rate of 11.72 for reciprocating-engine helicopters was 7.7 times higher than the multi-engine turbine rate.

The rate of fatal accidents involving multi-engine turbine helicopters was 23 percent of the single-engine rate and 16 percent of the reciprocating-engine rate. Fatalities per 100,000 flight hours increased from 0.74 in 2006 to 1.17 in 2007 for single-engine turbine helicopters, a jump of 58 percent. For multi-engine turbine helicopters, there was a corresponding drop from 1.11 to 0.61, a 45 percent improvement.

Flight instruction as a type of operation accounted for the highest percentage — 31 percent — of total U.S. civil helicopter accidents in 2007, a higher ranking than the 10-year average percentage for instructional accidents (Table 3, p. 50). Personal use operations resulted in 22 percent of accidents. Percentages of all other types of operation were in the single digits.

Canadian 2007 Accident Data

Turning to another subject, Canadian-registered aircraft were involved in 56 accidents in 2007, roughly in line with the 2003–2007 average of 57 (Table 4, p. 50), as reported by the Transportation Safety Board of Canada (TSB).[2] Three of the 2007 accidents were fatal, compared with the 2003–2007 average of five. The 17 accidents involving on-demand (air taxi) operations was 42 percent higher than the five-year average of 12.

There were five fatalities in Canadian aircraft accidents in 2007, the TSB said. That was 44 percent lower than the average of nine for the 2003–2007 period. Serious injuries in 2007 were higher than the five-year average, at 13 versus eight, respectively.

Two fewer Canadian airplanes were involved in accidents in 2007 compared with the 2003–2007 average, with an equal number of helicopters involved (Table 5, p. 51). Three aircraft were involved in fatal accidents in 2007, compared with the five-year average of four.

Rates for accidents, fatal accidents and fatalities were lowest in the multi-engine turbine category.

Type of Operation as a Percentage of Total U.S. Civil Helicopter Accidents, 1998–2007

Activity	10-Year Average	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
Total accidents	**190.8**	**178**	**162**	**193**	**180**	**214**	**205**	**182**	**206**	**197**	**191**
Instructional (FARs Part 91)	37.2 (19.6%)	55 (30.9%)	46 (23.8%)	42 (23.3%)	37 (18.0%)	43 (20.1%)	37 (18.0%)	32 (17.6%)	31 (15.0%)	22 (11.1%)	32 (16.8%)
Personal (FARs Part 91)	41.0 (21.5%)	39 (21.9%)	31 (19.0%)	46 (23.8%)	44 (24.7%)	41 (19.2%)	50 (24.4%)	39 (21.4%)	41 (19.9%)	34 (17.3%)	45 (23.6%)
Business (FARs Part 91)	10.2 (5.4%)	9 (5.1%)	13 (8.0%)	12 (6.2%)	8 (4.6%)	10 (4.7%)	11 (5.4%)	12 (6.6%)	14 (6.8%)	10 (5.1%)	3 (1.6%)
Public use (FARs Part 91)	18.0 (9.4%)	9 (5.1%)	15 (9.2%)	16 (8.3%)	14 (8.0%)	20 (9.5%)	21 (10.2%)	19 (10.4%)	26 (12.6%)	27 (13.7%)	13 (6.8%)
Positioning/ferry (FARs Part 91; excludes air medical)	10.0 (5.2%)	2 (1.1%)	11 (6.7%)	12 (6.2%)	5 (2.8%)	13 (6.1%)	10 (4.9%)	10 (5.5%)	13 (6.3%)	11 (5.6%)	13 (6.8%)
Sightseeing (FARs Part 91)	3.3 (1.7%)	2 (1.1%)	4 (2.4%)	4 (2.1%)	2 (1.1%)	3 (1.4%)	2 (1.0%)	2 (1.1%)	4 (1.9%)	4 (2.0%)	6 (3.1%)
Aerial observation (FARs Part 91)	7.1 (3.7%)	5 (2.8%)	6 (3.7%)	4 (2.1%)	9 (5.1%)	8 (3.8%)	8 (3.9%)	5 (2.7%)	7 (3.4%)	13 (6.6%)	6 (3.1%)
Executive/corporate (FARs Part 91)	0.4 (0.2%)	0 (0.6%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1.0 (0.5%)	0 (0.0%)	0 (0.0%)	1 0 (0.5%)	0 (0.0%)
Air medical service (FARs Part 91 and Part 135)	10.8 (5.7%)	11 (6.2%)	10 6.1%)	12 (6.2%)	11 (6.3%)	15 (7.1%)	11 (5.4%)	10 (5.5%)	12 (5.8%)	10 (5.1%)	6 (3.1%)
Air taxi (FARs Part 135) (Non–air medical/air tour)	11.1 (5.8%)	12 6.7%)	11 (6.7%)	7 (3.6%)	14 (7.8%)	17 (8.0%)	14 (6.8%)	11 (6.0%)	8 (3.9%)	12 (6.1%)	5 (2.6%)
Commercial air tour (FARs Part 135)	4.0 (1.9%)	4 (2.2%)	6 (3.7%)	4 (2.1%)	4 (2.3%)	5 (2.4%)	2 (1.0%)	5 (2.7%)	5 (2.4%)	3 (1.5%)	2 (1.0%)

FARs = U.S. Federal Aviation Regulations

Note: Certain activities have been excluded, so percentages in any year do not total 100.

Source: Helicopter Association International

Table 3

Accidents and Fatal Accidents, Canada, 2003–2007

	Canadian-Registered Aircraft Accidents		Fatal Accidents	
	2007	2003–2007 Average	2007	2003–2007 Average
Total aircraft involved	**56**	**57**	**3**	**5**
Airplanes involved	49	51	3	3
Airliners	2	2	0	0
Commuters	1	2	0	0
Air taxis	17	12	3	2
Aerial work	3	1	0	0
State	1	1	0	0
Corporate	0	1	0	0
Private/other	25	32	0	2
Helicopters involved	8	8	0	1
Other aircraft involved	1	1	0	0

Note: Ultralight aircraft are excluded. Some accidents may involve multiple aircraft, so the total number of aircraft involved may differ from the accident total. Five-year averages have been rounded. Figures are preliminary as of May 16, 2008.

Source: Transportation Safety Board of Canada

Table 4

"Declared emergency" topped the list of reportable incidents among all aircraft, with 118 reports, a 16 percent increase over the 2003–2007 average of 102 (Table 6, p. 51). "Other" incidents, "engine failure," "risk of collision/loss of separation" and "smoke/fire" were next in order of number of occurrences. Engine failure and smoke/fire were more frequently reported in 2007 than in the five-year average, while the number of reported collision risk incidents was 16 percent less than the average.

In terms of the numbers of Canadian-registered aircraft involved rather than the numbers of reported incidents, "risk of collision/loss of separation" ranked highest in 2007, although the number was seven fewer than the 2003–2007 average (Table 7, p. 51). "Declared emergency" was next, with 12 fewer than the five-year average. The number of aircraft

Canadian-Registered Aircraft Involved in Accidents, by Type of Operation, 2003–2007

	2007	2003–2007 Average
Accidents		
Airplanes Involved	49	51
Training	9	8
Pleasure/travel	15	23
Business	3	2
Test/demonstration/ferry	1	1
Air transport	15	13
Air ambulance	1	1
Other/unknown	5	3
Helicopters involved	8	8
Training	2	1
Pleasure/travel	1	1
Business	1	0
Test/demonstration/ferry	2	1
Air transport	0	2
Air ambulance	0	0
Other/unknown	2	3
Fatal accidents		
Airplanes and helicopters involved	3	4
Training	0	0
Pleasure/travel	0	1
Business	0	0
Test/demonstration/ferry	1	0
Air transport	1	2
Air ambulance	1	0
Other/unknown	0	0

Note: Ultralight aircraft are excluded. Some accidents may involve multiple aircraft, so the total number of aircraft involved may differ from the accident total. Five-year averages have been rounded, so total aircraft involved may not equal the sum of averages. Figures are preliminary as of May 16, 2008.

Source: Transportation Safety Board of Canada

Table 5

involved in "smoke/fire" incidents exceeded the five-year average by seven.

Notes

1. Available via the Internet at <www.rotor.com/Default.aspx?tabid=597>.
2. Transportation Safety Board of Canada. Data are available via the Internet at <www.tsb.gc.ca/en/stats/air/2008_apr/index.asp>.

Reportable Incidents, All Aircraft, Canada, 2003–2007

	2007	2003–2007 Average
Risk of collision/loss of separation	47	56
Declared emergency	118	102
Engine failure	49	45
Smoke/fire	40	36
Collision	5	7
Other	50	49
Total	**309**	**295**

Note: Five-year averages have been rounded. Figures are preliminary as of May 16, 2008.

Source: Transportation Safety Board of Canada

Table 6

Canadian-Registered Aircraft Involved in Reportable Incidents, 2003–2007

	2007	2003–2007 Average
Risk of collision/loss of separation	74	81
Air proximity	22	23
Air traffic control event	45	47
Altitude	2	3
Runway incursion	3	3
Other	2	4
Declared emergency	54	66
Landing gear failure	7	11
Hydraulic failure	12	9
Electrical failure	2	3
Other component failure	26	23
Other	7	20
Engine failure	34	34
Power loss	23	16
Component failure	10	16
Other	1	1
Smoke/fire	37	30
Fire/explosion	31	23
Component failure	5	7
Other	1	0
Difficulty in controlling aircraft	18	14
Component failure	3	6
Weather-related	10	4
Other	5	4

Note: Five-year averages have been rounded, so total incidents may not the equal sum of averages. Figures are preliminary as of May 16, 2008.

Source: Transportation Safety Board of Canada

Table 7