

U.K. Business Jet Accident Rates Comparatively High

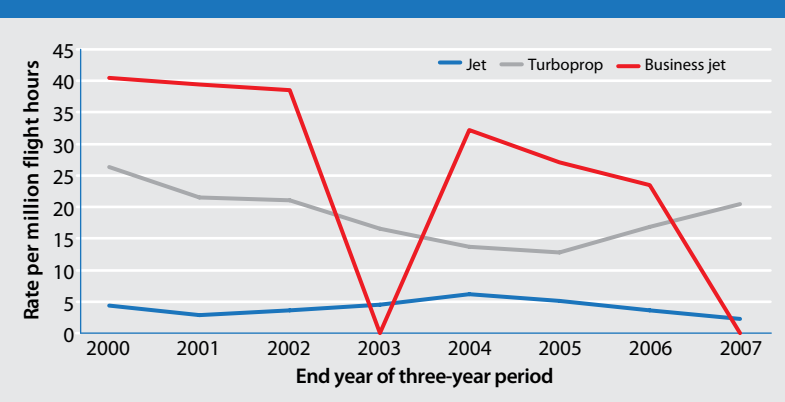
Engine problems were the most frequent factor in serious incidents among large aircraft.

BY RICK DARBY

Rates of reportable accidents were highest for business jets among all U.K. classes of large public transport aircraft in the 1998–2007 period, according to a new review by the U.K. Civil Aviation Authority.¹ The reportable accident rate for business jets was more than four times that for jets, a category that excludes business jets.² Their fatal accident rate was six times higher than that for turboprops and more than 200 times higher than that for jets.³

This reportable accident rate was also more volatile than the rates for jets and turboprops when shown as a three-year moving average (Figure 1).⁴ At 16.8 per million flight hours, this rate for business jets remained lower than that for turboprops (Table 1). The fatal accident rate, 8.4 per million flight hours, compared with 1.4 per million flight hours for turboprops and 0.04 per million flight hours for jets.

Reportable Accident Rates, U.K. Large Aircraft, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 1

Reportable and Fatal Accident Rates, U.K. Large Public Transport Airplanes, 1998–2007

Class of Aircraft	Reportable Accident Rate per million flight hours	Fatal Accident Rate per million flight hours
Business jet	16.8	8.4
Jet	3.9	0.04
Piston	0.0	0.0
Turboprop	20.2	1.4
All classes of aircraft	4.8	0.2

Source: U.K. Civil Aviation Authority

Table 1

Incidents, especially serious incidents, are widely considered significant because they may be “accidents waiting to happen.”⁵ The serious incident rate for business jets was also volatile, but by the last rolling three-year period, ending in 2007, it was lower than the corresponding rate for both jets and turboprops (Figure 2). In the overall 10-year period, business jet serious incidents clocked in at 8.4 per million flight hours — the same as the fatal accident rate — compared with 5.1 for jets and 17.8 for turboprops.

The review also categorizes the serious incidents for the period involving large public transport airplanes (Figure 3). The 10 factors most frequently associated with serious incidents applied to 76 percent of all serious incidents. Heading the list are “engine,” “smoke/fumes in cabin or flight deck,” “flight control problem,” “runway excursion” and “runway incursion.”

“Over 42,000 occurrences involving large public transport airplanes were reported between 1998 and 2007,” the review says (Figure 4, p. 50). “The figure includes both accidents and serious incidents, which together form less than 1 percent of the total [occurrences]. The three-year moving average occurrence rate has increased 30 percent, from 1,400 per million [flight] hours in the period 1997–2000 to 1,800 per million hours in the period 2005–2007.”

Although the overall occurrence rate increased, the rate of what the CAA defines as “high-severity” occurrences decreased (Figure 5, p. 50). “In the 10-year period, 0.8 percent of occurrences involving large public transport airplanes have been considered to be high-severity,” the

review says. “The three-year moving average high-severity occurrence rate has decreased 70 percent, from 24.7 per million [flight] hours in the period 1997–2000 to 7.4 per million hours in the period 2005–2007.”

For small public transport airplanes, the reportable and fatal accident rates showed an improving trend, although the reportable accident rate was volatile (Figure 6, p. 50).

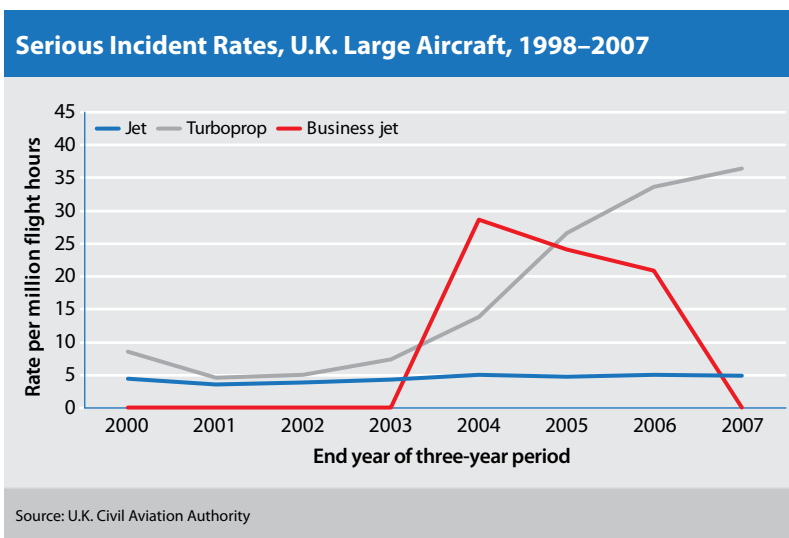


Figure 2

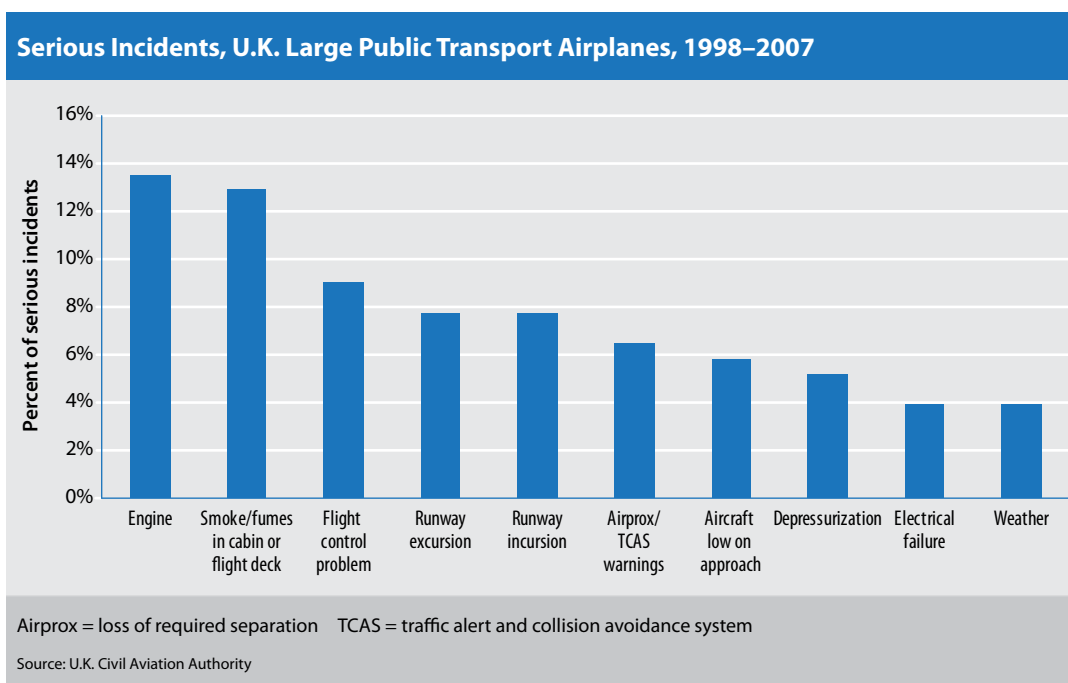
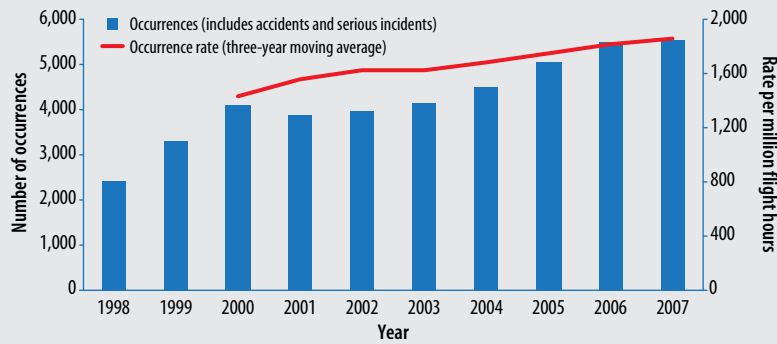


Figure 3

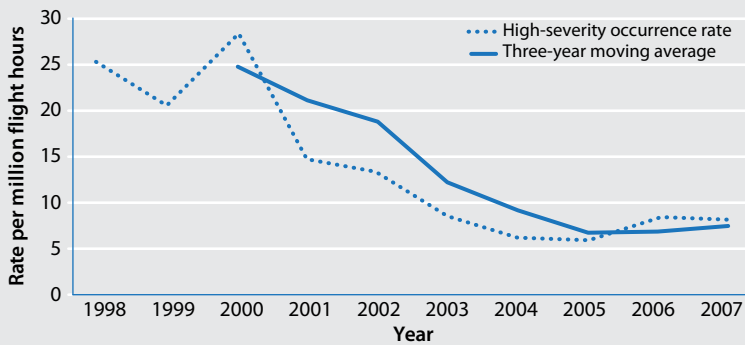
Occurrences, U.K. Large Public Transport Airplanes, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 4

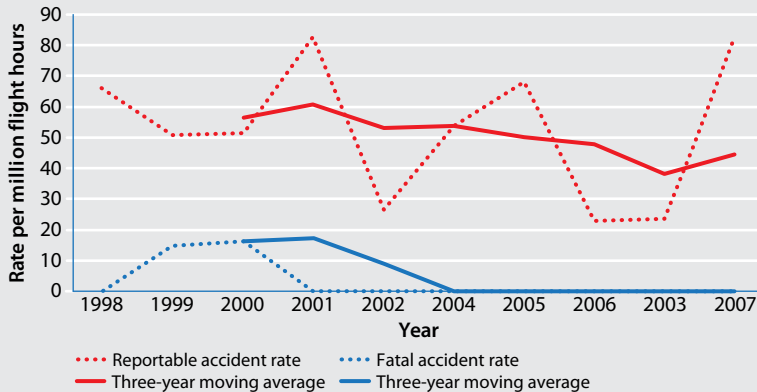
High-Severity Occurrences, U.K. Large Public Transport Airplanes, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 5

Reportable and Fatal Accident Rates, U.K. Small Aircraft, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 6

About 650 occurrences for small public transport airplanes presented a similar picture to their larger counterparts. The three-year moving average occurrence rate increased by 84 percent from 1998–2000 to 2005–2007. The three year moving average high-severity occurrence rate, however, decreased by 31 percent in the same time frame (Figure 7).

Helicopter operations — including all U.K.-registered or -operated helicopters engaged in public transport operations — were categorized as “emergency services,” “offshore” and “other,” the last being mainly passenger flights. There were 25 reportable accidents in the 1998–2007 period (Figure 8). Among them were four fatal accidents with a total of 22 fatalities. Of the four, two occurred during emergency services and two during offshore operations.

“Overall, the rate of reportable accidents involving public transport helicopters was 19.1 per million [flight] hours, and the fatal accident rate was 3.1 per million hours,” the review says.

Public transport helicopters were involved in 11 serious incidents during the study period, all in offshore operations, except in 2004 and 2005. No serious incidents were recorded in 2000, 2001, 2003 and 2006.

During the period, 1.9 percent of occurrences were classified as high-severity. There was no obvious trend (Figure 9).

Summing up the differences between the latest data and those from the previous edition of the safety review, which looked at the 1995–2004 period, the review says concerning large public transport airplanes, “The number of reportable accidents has [been] reduced from 162 to 132 ... and the number of fatal accidents has remained the same. A comparison of the three-year moving average reportable accident rates at the end of the two time periods examined shows an overall reduction: In the three-year period ending 2004, the rate was 6.7 reportable accidents per million hours, whereas in the three-year period ending 2007, the rate was 3.1 reportable accidents per million hours.”

In the data subset for U.K. public transport helicopters, the number of reported occurrences

rose from 2,200 in the previous period to 2,400 in the most recent. The number of reportable accidents decreased, from 31 to 25, while the number of fatal accidents was the same — four — in both study periods.

“The three-year moving average reportable accident rate in 2004 was 17.7 per million [flight] hours, but by 2007 this figure had [been] reduced to 11.8 per million hours,” the review says. “Similarly, the three-year moving average fatal accident rate [was] reduced from 2.5 in the period ending 2004 to 2.4 in the period ending 2007.”

Numbered Swiss Account

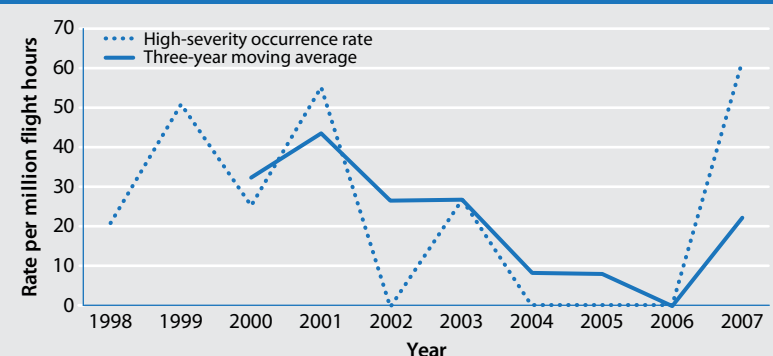
A different report, published by the Swiss Aircraft Accident Investigation Bureau, indicated that the total number of accidents and serious incidents involving Swiss-registered aircraft decreased to 52 in 2007 from 72 in 2006 despite an increase in flight hours (Table 2, p. 52).⁶ It was the lowest combined total since 1998.

The 2007 total number of accidents, 43, was the lowest in the period beginning in 1996. Serious incidents were down to nine in 2007 from 14 the previous year.

For large aircraft — greater than 5,700 kg/12,500 lb — the number of accidents and serious incidents among Swiss-registered aircraft in Switzerland was reduced by half, from 12 to six, between 2006 and 2007 (Table 3, p. 52). None of those occurrences involved injuries. The number of accidents involving Swiss-registered helicopters in Switzerland decreased from 11 to seven.

Among accidents and serious incidents involving large airplanes in 2007 — including Swiss-registered airplanes in Switzerland and abroad, and non-Swiss airplanes in Switzerland — four of nine occurred during the landing phase of flight; three during cruise; and two during descent and approach. Among helicopter accidents and serious incidents, four of 10 happened in descent and approach, four in landing, one on the ground, in rolling or in hovering flight; and one during cruise. ➔

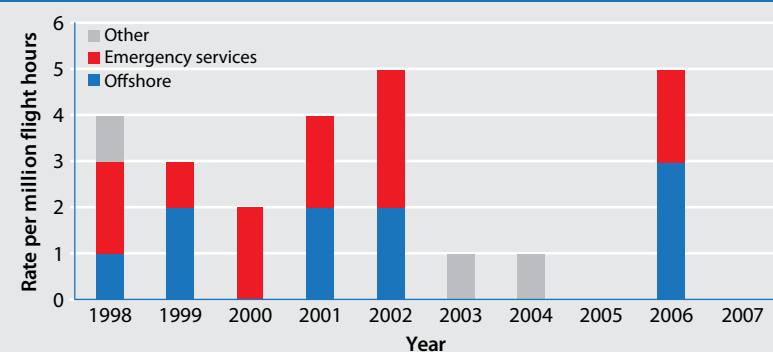
High-Severity Occurrences, Public Transport Airplanes, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 7

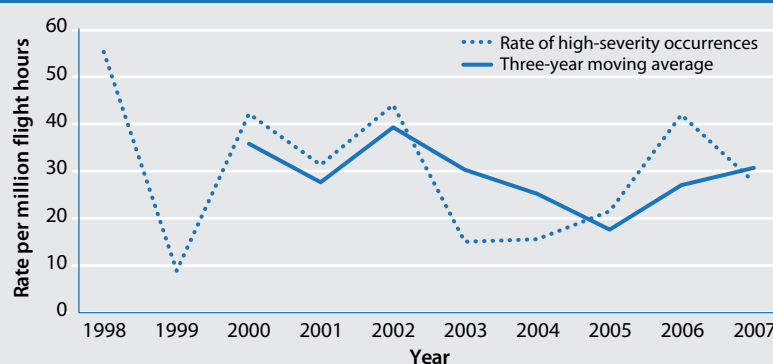
Reportable Accidents, U.K. Public Transport Helicopters, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 8

High-Severity Occurrences, U.K. Public Transport Helicopters, 1998–2007



Source: U.K. Civil Aviation Authority

Figure 9

Notes

1. *Aviation Safety Review — 2008*. Civil Aviation Publication (CAP) 780. Nov. 11, 2008. Covering U.K., European region and worldwide occurrence data, the document is available via the Internet at <www.caa.co.uk/application.aspx?catid=33&pagetype=65&appid=11&mode=detail&id=3325>. *Public*

transport operations include ambulance, cargo, passenger, police support or search and rescue. *Large airplanes* are those exceeding 5,700 kg/12,500 lb maximum takeoff weight; *small airplanes* are those up to that weight. Among large public transport airplanes, U.K. aircraft classes comprise business jet, jet, piston and turboprop.

2. A *reportable accident* meets the definition used by the International Civil Aviation Organization (ICAO). The majority of the data in the review are sourced from the U.K. CAA's Mandatory Occurrence Reporting (MOR) Scheme. U.K. occurrences, the subject of this article, were those involving U.K.-registered or -operated aircraft, or in U.K. airspace. In the 1998–2007 period, that represented about 78,000 occurrences.
3. The report does not specifically say that turboprops exclude business airplanes, but this appears to be the implication.
4. A *moving average* is an average that is recomputed periodically by removing the oldest data and including the latest data. Its effect is to smooth out the data points and make trends more visible.
5. In line with the ICAO definition, a *serious incident* is an incident involving circumstances indicating that an accident nearly occurred.
6. *2007 Statistics Concerning Accidents and Serious Incidents Involving Swiss-Registered Aircraft in Switzerland and Abroad and Foreign-Registered Aircraft in Switzerland*. Available via the Internet at <www.bfu.admin.ch/en/dokumentation_jahresstatistiken.htm>.

Accidents and Serious Incidents, Swiss-Registered Aircraft, 1996–2007

Year	Flight Hours	Total Number of Accidents	Number of Serious Incidents (including Airprox)	Total Number of Accidents and Serious Incidents	Number of Fatalities
1996	833,000	51	2	53	29
1997	750,676	69	0	69	26
1998	739,236	46	2	48	250
1999	778,373	53	16	69	19
2000	828,363	53	27	80	51
2001	758,470	46	18	64	50
2002	844,389	50	16	66	16
2003	873,540	70	24	95	24
2004	749,535	63	18	81	14
2005	768,643	59	16	75	15
2006	715,572	58	14	72	10
2007	766,557	43	9	52	12

Airprox = loss of required separation

Source: Swiss Aircraft Accident Investigation Bureau

Table 2

Accidents and Serious Incidents, Swiss-Registered Aircraft in Switzerland and Abroad, and Non-Swiss Aircraft in Switzerland, 2006–2007

	Swiss-Registered Aircraft in Switzerland						Swiss-Registered Aircraft Abroad						Non-Swiss Aircraft in Switzerland					
	Total		Persons Injured		Persons Not Injured		Total		Persons Injured		Persons Not Injured		Total		Persons Injured		Persons Not Injured	
	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006
Aircraft with MTOW 2,250–5,700 kg	3	0	2	0	1	0	2	0	0	0	2	0	4	1	0	0	4	1
Aircraft with MTOW > 5,700 kg	6	12	0	0	6	12	1	1	0	0	1	1	2	0	0	0	2	0
Helicopter	7	11	2	2	5	9	3	1	1	0	2	1	0	0	0	0	0	0

MTOW = maximum takeoff weight

Source: Swiss Aircraft Accident Investigation Bureau

Table 3