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Business Jet Paradox

Over a 10-year period, U.K. operators had the highest reportable accident rate but the lowest serious incident rate.

During 2000–2009, business jets had the highest reportable accident rate and fatal accident rate among all large airplanes used in public transport in the United Kingdom.¹ However, the trend has turned around in recent years, with the reportable accident rate for business jets lower than those for otherwise-classified jets and turboprops in the three-year subset ending in 2009. The data are reported by the U.K. Civil Aviation Authority (CAA) in a comprehensive study of the 10-year period.²

A total of 113 reportable accidents occurred, the report says. In descending order of percentage of accidents, they were categorized as “ramp incident” — about 35 percent — and “abnormal runway contact/runway excursion” — slightly less than 25 percent, followed by “aircraft technical malfunction/failure,” “loss of control,” “ground conflict including runway incursion,” “other” and “in-flight fire/smoke/fumes.”

“Three accidents involved fatalities to aircraft occupants, with a total of

five fatalities,” the report says. “One accident involved a third-party fatality.” The data included 15 serious injuries and 44 minor injuries.

The reportable accident rate for all these aircraft classes during the study period was 9.8 per million flights, with a fatal accident rate of 0.3 per million flights (Table 1).³ Three-year moving averages show a downward trend for both rates, with the reportable accident rate at its lowest for the subset of years ending in 2009.⁴

Business jets during the study period had a reportable accident rate of 19.4 per million flights, nearly double that for all large airplane classes. The business jet fatal accident rate of 9.7 per million flights was about 32 times the 0.3 rate for all large airplane classes.

Yet, looking at reportable accident three-year moving averages for jets, turboprops and business jets, a different picture emerges (Figure 1). All three showed a trend of declining rates, but the most prominent was business jets. For the subset years ending in 2007, 2008 and 2009, the business jet rate improved more than the other classes. For

U.K. Reportable and Fatal Accident Rates, by Aircraft Class, 2000–2009

Class of aircraft	Reportable accident rate (per million flights)	Fatal accident rate (per million flights)	Reportable accident rate (per million hours)	Fatal accident rate (per million hours)
Business Jet	19.4	9.7	14.1	7.1
Jet	9.1	0.0	3.4	0.0
Piston	0.0	0.0	0.0	0.0
Turboprop	15.5	1.0	16.0	1.1
All classes of aircraft	9.8	0.3	4.2	0.1

Note: Rates are for airplanes in public transport with a maximum total weight greater than 5,700 kg/12,500 lb.

Source: U.K. Civil Aviation Authority

Table 1

the subset years ending in 2009, the fatal accident rate was also at its lowest in the study period.

The 2000–2009 period also included 179 serious incidents, of which “aircraft technical failure/malfunction” was the most common type, followed by “in-flight fire/smoke/fumes.”⁵ In contrast to the accidents, business jets had the lowest serious incident rate — 9.7 per million flights — of the three airplane classes (Table 2). The comparable rate for jets was 14.9, for turboprops 20.1, with the overall rate for all classes 15.7.

As with fatal accident and reportable accident rates, the serious incident rate for business jets decreased in the latter part of the study period and was at its lowest for the three-year subsets ending in 2007 through 2009 (Figure 2).

The study examined data for U.K.-registered or -operated helicopters in public transport operations from 2000 to 2009.

“The reportable accident rate was 8.3 per million flights and the fatal accident rate was 1.1 per million flights,” the report says. There were 22 reportable accidents and three fatal accidents, with a toll of 34 fatalities.

The CAA divided helicopter public transport into three categories for analysis: “emergency services,” “offshore” and “other.” Emergency services operations comprise emergency medical services, police support, and search and rescue. The offshore category consists of passenger and cargo flights to oil and gas extraction or drilling platforms in the North Sea or Irish Sea. “The ‘other’ category comprises land-based passenger and cargo operations, but is predominantly passenger flights,” the report says. Helicopters involved in the “other” operations had no fatal accidents and one reportable accident in the 2000–2009 period.

Based on the three-year moving average, the fatal accident rate remained fairly steady in the 2000–2009 span (Figure 3, p. 50). Reportable accident averages in the same time frame varied more, reaching a peak with the subset ending in 2002 and a low with the subset ending in 2005.

The trend for offshore helicopter fatal and reportable accident rates also bottomed out in the subset ending in 2005 (Figure 4, p. 50). For

Trends in U.K. Reportable Accidents, Three-Year Moving Averages, by Aircraft Class

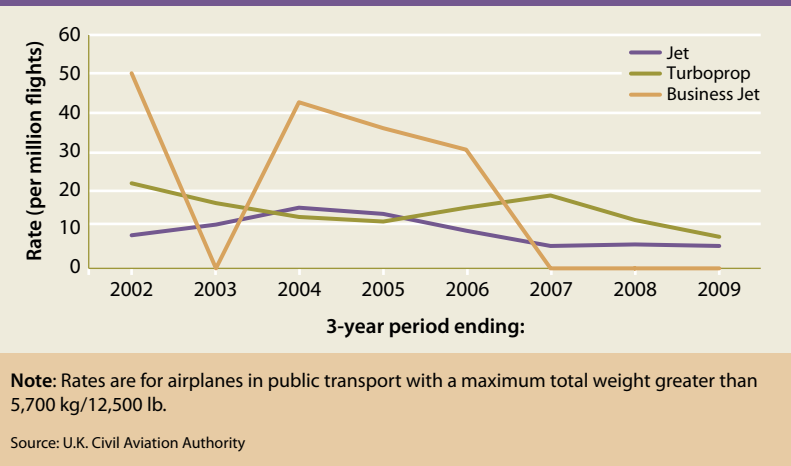


Figure 1

U.K. Serious Incident Rates, by Aircraft Class, 2000–2009

Class of aircraft	Serious incident rate (per million flights)	Serious incident rate (per million hours)
Jet	14.9	5.7
Turboprop	20.1	20.8
Business Jet	9.7	7.1
All classes of aircraft	15.7	6.7

Note: Rates are for airplanes in public transport with a maximum total weight greater than 5,700 kg/12,500 lb.
Source: U.K. Civil Aviation Authority

Table 2

Trends in U.K. Serious Incidents, Three-Year Moving Averages, by Aircraft Class

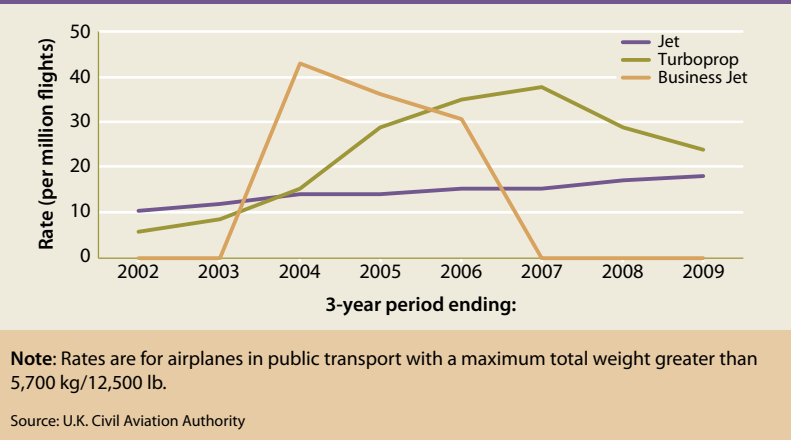
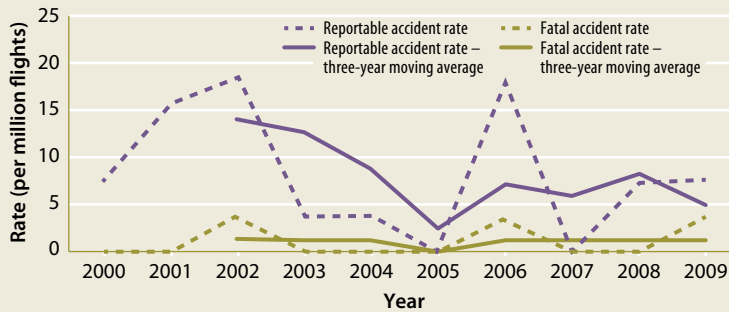


Figure 2

U.K. Reportable and Fatal Accident Rates, Helicopters, 2000–2009

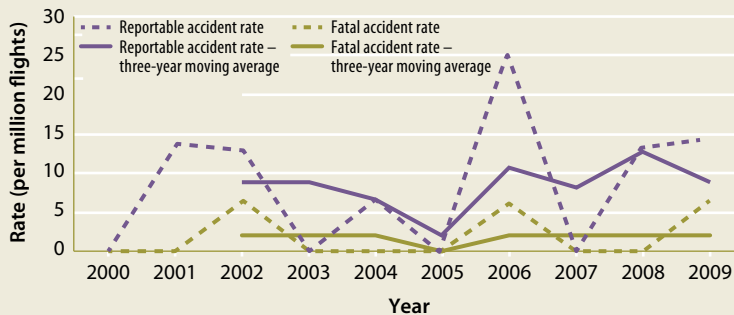


Note: Data are for all U.K. public transport helicopters.

Source: U.K. Civil Aviation Authority

Figure 3

U.K. Reportable and Fatal Accident Rates, Offshore Helicopters, 2000–2009

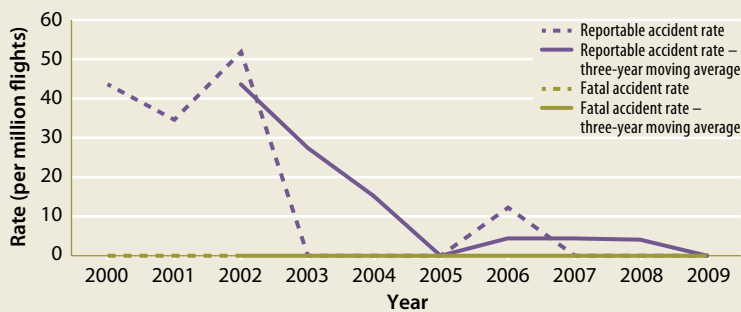


Note: Data are for all U.K. public transport offshore helicopters.

Source: U.K. Civil Aviation Authority

Figure 4

U.K. Reportable and Fatal Accident Rates, Emergency Services Helicopters, 2000–2009



Note: Data are for all U.K. public transport emergency services helicopters.

Source: U.K. Civil Aviation Authority

Figure 5

emergency services helicopters, the three-year moving average for reportable accidents decreased sharply from the subset ending in 2002 to the subset ending in 2005, and again bottomed out in the subset ending in 2009 (Figure 5). There were no emergency services operations fatal accidents.

For 2000–2009, the reportable accident rate for emergency services helicopters was 11.3 per million flights, 36 percent above the 8.3 for all helicopters studied. At 8.5 reportable accidents per million flights, the offshore helicopter category, with a fatal accident rate of 2.0 per million flights, also exceeded the rate for all helicopters studied.

U.K. public transport helicopters were involved in 12 serious incidents in the 10-year period, all but one of which involved twin-turbine helicopters.

The study considered data related to the safety of U.K. airspace and aerodromes, regardless of the country of registration. “ATC [air traffic control] occurrences” include runway incursions, altitude deviations, loss of separation, airspace infringements, ATC engineering problems and communication difficulties. “The involvement of ATC in an occurrence does not imply that ATC were at fault or even the cause of the occurrence,” the report says.

In U.K. airspace during the study period, there were 401 high-severity ATC occurrences, representing 1.6 percent of all ATC occurrences.⁶ Of those high-severity ATC occurrences, 82 percent were in uncontrolled airspace, 13 percent in controlled airspace and the others in airspace whose type was unknown.

“Airspace infringement,” “altitude deviation” and “loss of separation” were the most frequent types of ATC occurrence reported (Figure 6).

The study examined occurrences at U.K.-licensed aerodromes and involved civil aircraft. Such occurrences, the report says, may involve “an aerodrome’s infrastructure, or personnel working at the aerodrome ...” Security breaches are excluded except for “people or non-airport vehicles entering an aerodrome unescorted,” which can present a safety hazard.

Between 2000 and 2006, there were about 6,400 aerodrome occurrences. Their three-year moving average climbed steadily after 2002. Among the occurrences were 48 graded as high-severity, for which the three-year moving average bottomed out in 2006 (Figure 7).

“Ramp incidents” accounted for 33 percent of aerodrome occurrences, followed by “loading errors” at 14 percent and “runway obstruction/damage,” also at 14 percent.

Aircraft registered in or operated by countries outside the U.K. were involved in 199 reportable accidents in 2000–2008, including 21 fatal accidents resulting in 44 fatalities, the report says. About 22 percent involved public transport aircraft. No fatal accidents involving non-U.K.-registered public transport aircraft in U.K. airspace occurred during the study period, although there was one large-aircraft fatal accident involving a privately operated Bombardier CL-600. 🌀

Notes

1. The CAA’s criterion for a reportable accident is derived from the definition of “accident” in International Civil Aviation Organization Annex 13, *Investigation of Air Accidents and Incidents*. The data include U.K.-registered or -operated public transport aircraft both in the U.K. and elsewhere. “Public transport” includes operations involving passenger carrying, cargo, ambulance, police support or search and rescue. Large airplanes are those with a maximum total weight of more than 5,700 kg/12,500 lb.
2. “UK Safety Performance, Volume 1.” CAP 800, January 2011. Available via the Internet at <www.caa.co.uk/application.aspx?catid=33&pagetype=65&appid=11&mode=detail&id=4410>.
3. Events are classified as reportable accidents and serious incidents by the U.K. Air Accidents Investigation Branch, independently of the CAA.

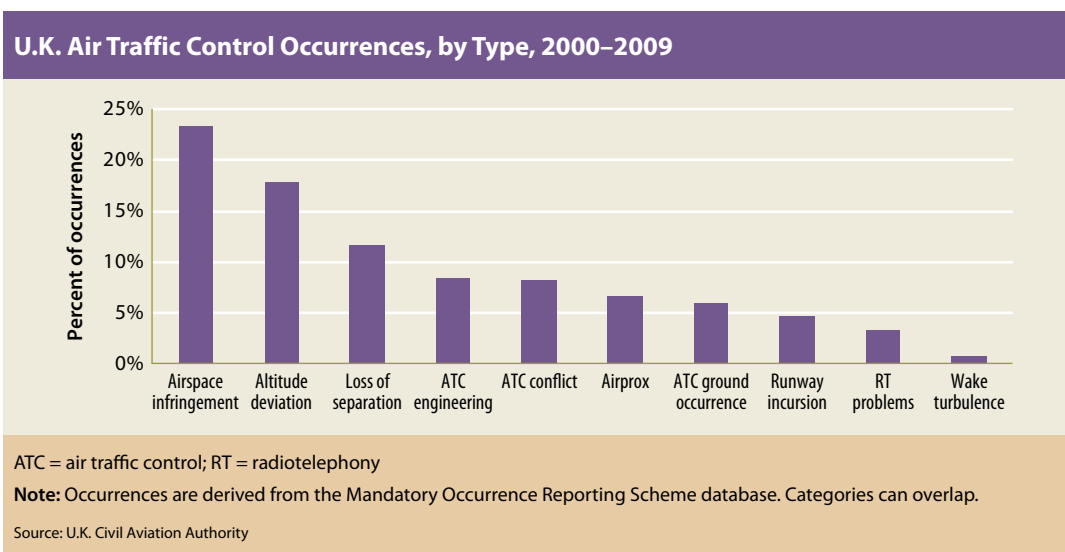


Figure 6

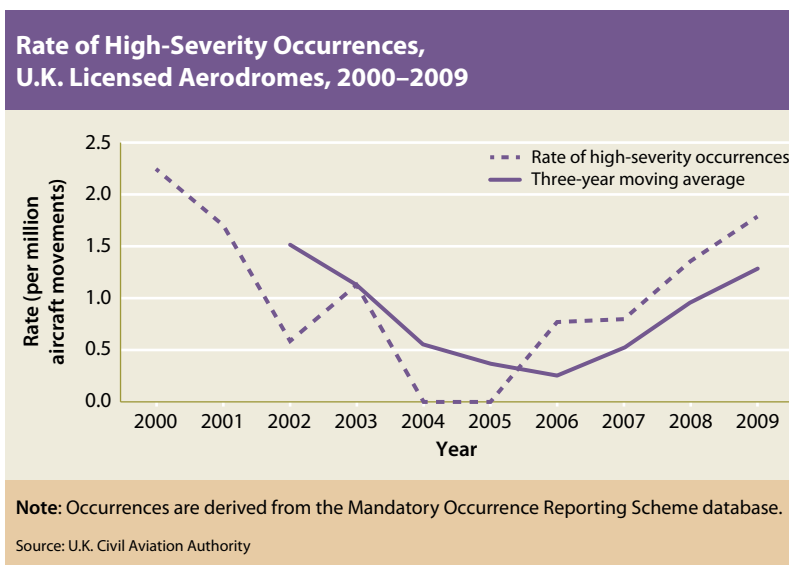


Figure 7

4. The moving average is a line connecting the averages of subsets within a full data set to indicate a trend rather than shorter-term fluctuations.
5. A “serious incident” is defined as “an incident involving circumstances indicating that an accident nearly occurred.”
6. The CAA grades severity of occurrences on a scale from A, high, to E, non-significant. ATC occurrence severity depends on factors such as the proximity of the aircraft involved and the ability of the pilot or controller to correct the situation. Occurrences are considered to be high severity if they have been assigned an A or B grade.