

Appendix 2

References Cited Other Than Core Documents

Note- A number of the documents referred to in my proof of evidence are very large and reference is made only to a small section that is relevant to the birdstrike issue. In these cases, for the sake of brevity, the relevant section of the document is reproduced in this appendix and a source to the full document provided.

2.1 Allan, J. R. (2002) The Costs Of Birdstrikes And Birdstrike Prevention. pp 147-153 in Clarke L. (ed.) *Human Conflicts With Wildlife: Economic Considerations*. US Department of Agriculture, Fort Collins.

2.2 Allan, J.R. (2006) A heuristic risk assessment technique for birdstrike management at airports. *Risk Analysis* 26: 723-727.

2.3 CAA (2008) CAP772 Birdstrike Risk Management for Aerodromes. Civil Aviation Authority London.

Safety Regulation Group



CAP 772

Birdstrike Risk Management for Aerodromes

www.caa.co.uk

2.4 CAA (2010) CAP 168 Licensing of Aerodromes Civil Aviation Authority, London.

Safety Regulation Group



CAP 168

Licensing of Aerodromes

www.caa.co.uk

2.5 Milsom, T.P. & Horton, N. (1995) Birdstrike. An assessment of the hazard on UK civil aerodromes 1976-1990. Central Science Laboratory, York.

2.6 Richardson, W.J, & West, T. (2000) Serious birdstrike accidents to military aircraft: updated list and summary. *Proceedings of 25th. Meeting International Birdstrike Committee, Amsterdam*, 67-97.

INTERNATIONAL BIRD STRIKE COMMITTEE

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SERIOUS BIRDSTRIKE ACCIDENTS TO MILITARY AIRCRAFT: UPDATED LIST AND SUMMARY

W. John Richardson ¹ & Tim West ²

¹ LGL Ltd., environmental research associates, 22 Fisher St.,
POB 280, King City, Ont. L7B1A6, Canada
Tel: +1 905 833 1244, Fax: +1 905 833 1244
e-mail: wjrichar@idirect.com [in 2008: wjr@LGL.com]

² 8 Arrowhead Drive, Lakenheath, Brandon, Suffolk IP279JN, U.K.

ABSTRACT

A total of 286 serious bird-related accidents to military aircraft from 32 countries (1950-99 period) are listed here or in two earlier papers. Serious accidents are those where an aircraft was destroyed or people were killed. This paper lists 59 "new" birdstrike accidents from the 32 countries in 1950-99, and provides more details for 110 accidents listed previously. The primary countries considered include most of those in Europe (east to Russia), Canada, U.S.A., Israel, Australia, and New Zealand. For most countries, accident data were provided or corroborated by military Flight Safety Offices, local birdstrike specialists, or aviation historians. Unofficial sources were also used extensively. Records are still incomplete to varying degrees, depending on country.

Of these 286 serious bird-related accidents, at least 63 were fatal, with at least 141 deaths (137 on the aircraft; 4 on the ground). The 1990s were the most costly decade, with at least 68 bird-related fatalities. Countries with maximum known numbers of bird-related accidents in 1950-99 are Germany (60 aircraft from at least 8 countries), U.K. (47), and U.S.A. (46+). Most cases involved jet fighter or attack aircraft with one engine (at least 179 accidents) or two engines (40+), and jet trainers (34+). Among the other military aircraft lost since 1950 were seven 4-engined aircraft (three in the 1990s).

Since 1950, many additional serious birdstrike accidents to military aircraft have been reported in Asia (especially India), and a few in Africa and South America. These reports, most unofficial and of uncertain reliability, are summarized briefly.

2.7 Thorpe, J. 2005 Fatalities And Destroyed Civil Aircraft Due To Birdstrikes 2003-2004 Proc 27th International Birdstrike Committee, Athens.

INTERNATIONAL BIRD STRIKE COMMITTEE

IBSC27/WP II-3
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FATALITIES AND DESTROYED CIVIL AIRCRAFT DUE TO BIRD STRIKES, 2002 to 2004

John Thorpe

Aviation Safety Adviser & Honorary IBSC Chairman
Brackens, Chapel Road, Smallfield, Surrey, RH8 9JH, UK
Tel.: 0044 1342 841584
E-mail: johnthorpe@fiysafe.fsnet.co.uk

Abstract

At the 1996 Meeting in London of the International Bird Strike Committee, an illustrated Working Paper was presented that provided brief details of all fatalities and destroyed aircraft due to bird strikes during the period 1912 to 1995. The paper was felt to be useful in drawing attention to the scale of the problem, especially when dealing with those who know little about the subject or who are newly appointed to decision-making positions. Since that paper was published, information has come to light on a number of previously unknown accidents, as well as information on subsequent accidents. Thus, a revised paper, published in the Proceedings as WP-SA1, 'Fatalities and Destroyed Civil Aircraft due to Bird Strikes, 1912 to 2002' was presented at IBSC 26, May 2003 in Warsaw, Poland.

This Paper for the Athens Meeting provides an up-date to WP-SA1 covering the years 2002 to 2004.

It is now believed that the number of fatal bird strike accidents has risen to 47 killing 242 people. In addition the total of aircraft destroyed is now 90. These additional accidents are briefly detailed in the Paper so that the totals are now:

- Airliners and Executive Jets – 12 fatal accidents killing 174 and destroying 37 aircraft.
- Aeroplanes 5,700 kg and below – 29 fatal accidents killing 58 and destroying 45 aircraft.
- Helicopters – 6 fatal accidents killing 10 people and destroying 8 helicopters.

The results are broadly unchanged in that the major threat (nearly 80% of accidents) to Airliners and Executive jets is engine ingestion, often due to flocks of gulls (*Larus sp.*). Aircraft of 5,700 kg and below as well as helicopters are most at risk from windshield penetration, mainly the result of collision with birds of prey (*Accipitriformes*). These groups of aircraft mainly fly at heights where birds are most likely to be encountered. Some accidents are the result of pilots attempting to avoid birds.

The new or revised material included since the Athens Meeting is shown with a marginal line. The Appendix on Animal Strikes, which was in the original version of the Athens Paper, has been removed as better information is available in WP Paper VI -3.

Keywords: civil aviation, general aviation, mishap investigation, statistics

2.8 Thorpe, J. (2010) update on fatalities and destroyed civil aircraft due to bird strikes with appendix for 2008 & 2009 *Proceedings of International Birdstrike Committee 29*, Cairns.

29th Meeting of the International Bird Strike Committee, Cairns (Australia) 2010
IBSC 29/WP

UPDATE ON FATALITIES AND DESTROYED CIVIL AIRCRAFT DUE TO BIRD STRIKES WITH APPENDIX FOR 2008 & 2009

J. Thorpe

John Thorpe FRAeS, Aviation Safety Adviser & Past IBSC Chairman
Brackens, Chapel Road, Smallfield, Surrey, RH6 9JH, UK
00 44 1342 841564, johnthorpe@flysafe.fsnet.co.uk

ABSTRACT

At the IBSC 26 Meeting in Warsaw Poland, May 2003 an illustrated Working Paper WP-SA1 (p.87 of Proceedings) 'Fatalities and Destroyed Civil Aircraft due to Bird Strikes 1912 to 2002' provided brief details of all cases during the period. Since then information has become available on some previously unknown accidents, as well as information on subsequent accidents. Thus, at IBSC 27, Athens May 2005 an update, WP II-3 (p.65 of Proceedings) was presented covering the years 2002 to 2005 and at IBSC 28 Brasilia November 2008 covering 2006 to 2008. This paper provides brief details on further cases in 2008 and 2009 as well as re-appraised data covering the period 1912 to 2008.

These papers are felt to be useful in drawing attention to the scale of the problem, especially when dealing with those who know little about the subject or who are newly appointed to decision-making positions. A consolidated Paper to replace the Warsaw IBSC 26 Paper will be prepared for IBSC30 in Norway.

It is now believed that the total number of fatal bird strike accidents is 54, killing 276 people and destroying 108 aircraft. These additional accidents are briefly detailed in the Paper so that the totals are now:

- Airliners and Executive Jets – 15 fatal accidents killing 188 and destroying 42 aircraft.
- Aeroplanes 5,700 kg and below – 32 fatal accidents killing 70 and destroying 56 aircraft.
- Helicopters – 7 fatal accidents killing 18 people and destroying 9 helicopters.

The results are broadly unchanged in that the major threat (nearly 80% of accidents) to Airliners and Executive jets is engine ingestion, often due to flocks of gulls (*Larus sp.*). Aircraft of 5,700 kg and below as well as helicopters are most at risk from windshield penetration, mainly the result of collision with birds of prey (*Accipitriformes*). These groups of aircraft mainly fly at heights where birds are most likely to be encountered. Some accidents are the result of pilots attempting to avoid birds.

The Author would welcome any new or additional information.

Keywords: civil aviation, general aviation, mishap investigation, statistics

INTRODUCTION

The paper contains brief details of each case of loss of life or destruction of the aircraft between 2006 and 2008 divided into three Appendices:

- Appendix 1 - Aeroplanes over 5,700 kg (12,500 lb) and all business jets
- Appendix 2 - Aeroplanes of 5,700 kg and below
- Appendix 3 – Helicopters