

## SERIOUS BIRD STRIKES TO CIVIL AIRCRAFT 1989-1991

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### SUMMARY

The Paper contains a sample of summarised accidents and more serious incidents due to bird strikes in the years 1989-1991. The paper is divided into three sections:

- Transport aeroplanes over 5,700 kg and business jets
- Aeroplanes of 5,700 kg and below
- Helicopters.

The data sample is too small for any in-depth analysis but engine ingestion is clearly the critical area of transport aeroplanes. The windshield appears to be the vulnerable area of general aviation aircraft and helicopters. The paper lists previous similar publications.

The Author would welcome any new or additional information which has not been included within the paper. A marginal line shows alterations between Issue 1 (distributed at Meeting) and Issue 2.

## 1 Introduction

A number of serious bird strike accidents and incidents occur each year throughout the world. This paper attempts to detail these events obtained from the following major sources:-

- UK Reporting System 1989/90/91
- Flight Safety Foundation Bulletin 1990/1
- Lloyds List 1990/91
- European Reporting Systems
- ICAO IBIS Significant Bird Strike List - 1989/90
- Miscellaneous Publications, including Flight International.

## 2 Scope

The term 'serious' for the purposes of this Paper includes:

- loss of life
- injury to occupants
- destruction of aircraft
- loss of, or damage to, more than one engine
- damage to one engine, together with ingestion in another engine
- uncontained engine failure
- fire
- significant sized holes, eg windshield, nose, radome
- major structural damage
- particularly unusual or dangerous features, eg complete obscuring of vision, multiple or significant system loss, helicopter rotor or transmission damage.

The paper has been divided into three sections:

- Transport aeroplanes over 5,700 kg and business jets
- Aeroplanes of 5,800 kg and below
- Helicopters.

The data sample is too small for any in-depth analysis. Fatal accidents have a box round the first line.

## 3 Previous Papers

Similar papers covering earlier years have been published as follows:

- 1912 to 1982 WP16 and 16A BSCE 16, Moscow August 1982
- 1981 to 1984 WP27 BSCE 17, Rome October 1984
- 1984 and 1985 WP4 BSCE 18, Copenhagen May 1986
- 1985 to 1987 WP22 BSCE 19, Madrid May 1988
- 1987 to 1989 WP29 BSCE 20, Helsinki May 1990

DATE	AIRCRAFT ENGINE
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11 Jan 89 B737

Both engines suffered from  
starlings (*Sturnus vulgaris*)

31 Jan 89 DC10

At rotation, 175 kts, the air  
returned due to vibration.

26 Feb 89 DC10

At 135 kts during the landi  
engineer entered the flight  
runway and stopped. Both  
passengers disembarked.  
Bird seen to run across run  
unknown.

13 Apr 89 B747

Abandoned take-off run at

25 May 89 A310

Struck vulture at 4,000 ft s  
damaged.

31 May 89 B737

At rotation multiple gull str  
parameters appeared nor  
Attendant reported high ne  
to return. Captain flew de  
normal on finals. First Off

07 Jun 89 BAe

At rotation on a midnight t  
hit many parts of the aircr  
1,000 ft for circuit and ove  
herring gulls (*Larus argen*  
changed as follows:

# TRANSPORT AEROPLANES OVER 5,700 KG AND BUSINESS JETS

DATE	AIRCRAFT/ ENGINE	REGN	LOCATION	INJURY
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11 Jan 89

**B737 (CFM56)**

**VH-TAH**

**Australia**

-

Both engines suffered from damage during take-off run. Precautionary landing. Birds were starlings (*Sturnus vulgaris* 80 gm).

31 Jan 89

**DC10 (CF6)**

**PH-MBT**

**Amsterdam,  
Netherlands**

-

At rotation, 175 kts, the aircraft struck a group of Lapwings (*Vanellus vanellus* 215 gm). Aircraft returned due to vibration. One blade damaged in Engines 1 and 3.

26 Feb 89

**DC10 (CF6)**

**G-MULL**

**Freetown, Sierra  
Leone**

-

At 135 kts during the landing roll while using reverse thrust there was a slight thrust loss. A station engineer entered the flight deck and informed the crew that Engine 3 was on fire. Taxied clear of runway and stopped. Both fire bottles discharged, extinguishing fire. Taxied to stand and passengers disembarked. Debris started grass fire at runway threshold. Severe LP fan damage. Bird seen to run across runway just after touchdown. Feathers found in engine tail pipe, species unknown.

13 Apr 89

**B747**

**ZS-**

**Windhoek, S Africa**

-

Abandoned take-off run after bird flew into engine. A number of tyres deflated.

25 May 89

**A310 (CF6)**

**VT-**

**Delhi, India**

-

Struck vulture at 4,000 ft shortly after take-off. Nose, pressure bulkhead and radar extensively damaged.

31 May 89

**B737 (CFM56)**

**G-BNNK**

**Venice, Italy**

-

At rotation multiple gull strikes. Captain's ASI fell to below 60 kts, airframe vibration. Engine parameters appeared normal apart from Engine 2 oil contents falling from 80-50%. No 1 Flight Attendant reported high noise level. Due to Engine 1 vibration level increased from 1½-2. Decided to return. Captain flew descent, First Officer took over on finals. Oil contents indication returned to normal on finals. First Officer was on first flight in -400 series.

17 Jun 89

**BAe 146 (A11 502)**

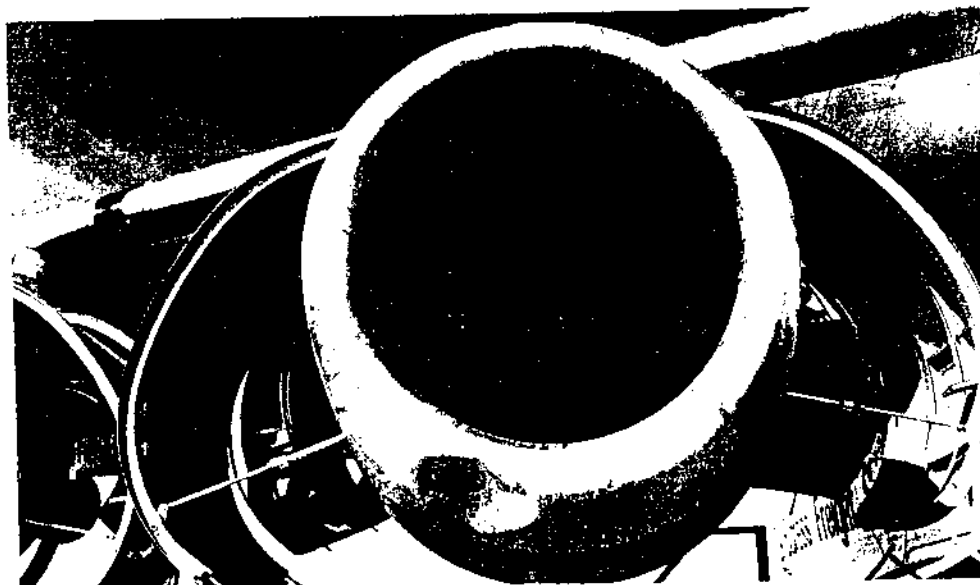
**G-TNTJ**

**Genoa, Italy**

-

At rotation on a midnight take-off from runway 11, a huge flock of gulls rose from the surface and hit many parts of the aircraft. All engines lost power and No 3 had to be shut down. Climbed to 3,000 ft for circuit and overweight return. There were 57 strikes to airframe from the Mediterranean gulls (*Larus argentatus* 1 kg). Three engine nose cowls damaged and all 4 engines damaged as follows:

- Engine 1 - most fan blades damaged.
- Engine 2 - two fan blades broken with penetration of casing, core damage. Fuel oil exchanger mountings adrift, both fire bottles found blown.
- Engine 3 - three fan blades bent, most have tip bends, HP compressor stators bent.
- Engine 4 - two fan blades badly bent, core damage, bypass duct stators 60% separated. There were various airframe dents.



**28 Jun 89            B737                    VT-            Delhi, India            Co-pilot injured**

Flock of birds smashed into cockpit injuring co-pilot and causing extensive damage. Aircraft returned. Damage cost approximately \$100,000.

**04 Jul 89            A300 (CF6)            D-AHLC    Munich, Germany    -**

At about 20 ft and 150 kts aircraft struck a flock of gulls. The aircraft diverted due to vibration on Engine 1. Damage to fan blades of both engines.

**10 Aug 89            A320 (CFM56)        VT-EPE    Delhi, India            -**

During final approach, 2,500 ft, 250 kts, a vulture hit the top of the captain's panel of the windshield, this was cracked but not penetrated and frame distorted. The impact caused loss of information on four of the six CRT displays and Engine 2 LP fuel valve cut out, causing engine to shut down. Single engine procedure flown without any information on the screen about the failure. After landing the captain's navigation screen also failed. Bird identified from two feathers jammed in windshield mounting as an Indian white-backed vulture (*Gyps bengalensis* 4.5 kg).

**10 Sep 89            B737 (J8D)            D-ABMF    Sestri, Italy            -**

Just after take-off at 135 kts a flock of gulls was struck. Blades were damaged in both engines as well as the stabiliser leading edge.

**06 Oct 89            A3**

Descending through 9,000 ft

**27 Oct 89            A3**

During take-off run struck  
One fan blade on each engine

**28 Oct 89            A3**

During take-off run struck  
on Engine 1 and four on

**30 Oct 89            Fo**

In the climb at 4,200 ft, 150 kts  
Aircraft returned.

**20 Nov 89            A3**

During the take-off run a  
fans of both engines. A

**06 Jan 90            B7**

Just after take-off at 20 ft  
in both engines, due to h  
blades damaged.

**29 Jan 90            B7**

At 155 kts during the take  
dumping 76 tons of fuel t  
had to be changed.

**28 Apr 90            BA**

At 10 ft, 152 kts the aircra  
gear down-lock jack was

**22 Jul 90            DC**

While descending through  
810 gm). The radome wa  
service for one month an

08 Oct 89	A320	F-GGEC	Nr Nîmes, France	-
Descending through 9,000 ft at 320 kts windshield damaged by unknown birds.				
27 Oct 89	A300 (CF6)	F-BVGD	Entzheim, France	-
During take-off run struck flock of Rock doves ( <i>Columba livia</i> 400 gm). Precautionary landing. One fan blade on each engine damaged.				
28 Oct 89	A300 (CF6)	F-BUAI	Entzheim, France	-
During take-off run struck flock of Rock doves ( <i>Colombia livia</i> 400 gm). One fan blade damaged on Engine 1 and four on Engine 2.				
30 Oct 89	Fokker F27	S2-ABP	Jessore, Bangladesh	Minor
In the climb at 4,200 ft, 158 kts, co-pilots side windshield was shattered. Co-pilot unconscious. Aircraft returned.				
20 Nov 89	A300 (CF6)	I-BUSL	Rome, FIU, Italy	-
During the take-off run a flock of Lapwings ( <i>Vanellus vanellus</i> 215 gm) was struck, damaging the fans of both engines. A precautionary landing was made.				
06 Jan 90	B737 (CFM56)	G-OMBM	Prestwick, UK	-
Just after take-off at 20 ft, struck flock of Black-headed gulls ( <i>Larus ridibundus</i> 275 gm). Ingestion in both engines, due to high vibration one throttled to idle. Precautionary landing. Found 10 fan blades damaged.				
29 Jan 90	B747 (CF6)	N1298E	Amsterdam, Netherlands	-
At 155 kts during the take-off run the aircraft struck a Grey heron ( <i>Ardea cinerea</i> 1.5 kg). After dumping 76 tons of fuel the aircraft returned. Left cabin windows 4, 5 and 6 were damaged and had to be changed.				
28 Apr 90	BAC 1-11	G-BJMV	Gerona, Spain	-
At 10 ft, 152 kts the aircraft struck a group of Herring gulls ( <i>Larus argentatus</i> 1 kg). The landing gear down-lock jack was damaged, resulting in loss of fluid on No 1 hydraulic system.				
22 Jul 90	DC9 (JT8D)	EC-BYG	Nr Madrid, Spain	-
While descending through 13,000 ft, 320 kts the aircraft struck a Bustard (believed - <i>Tetrax tetrax</i> 910 gm). The radome was holed, damaging the radar and nose gear well. The aircraft was out of service for one month and repairs cost \$60,000 US Dollars.				



Hooded crows (*Corvus corone* 530 gm), Jackdaws (*Corvus monedula* 234 gm) and Ravens (*Corvus corax* 1.1 kg).

21 May 91      DHC-7 (PT6)      G-BOAW      Nr Brussels, Belgium

At 3,000 ft, 200 kts on the approach a loud thud was heard. After landing 12" x 4" hole found in right wing leading edge.

24 Nov 91      DC10      N-161NS      Glasgow, UK

Shortly after rotation the aircraft suffered a multiple bird strike. ATC observed smoke and flame from Engine 3. Shutdown and fire extinguished. Found broken blade had exited through bottom of cowling. Birds remains on runway were Common gulls (*Larus canus*, 420 gm).

17 Dec 91      B747 (JT9D)      N203AE      Heathrow, UK

Although the crew were not aware, Black-headed gulls (*Larus ridibundus* 275 gm) were struck on the approach. Blood marks on left wing, main gear and Engine 2. Engine 1 was damaged with bent fan blades. Dead bird in left flap.

## HELICOPTERS

DATE	AIRCRAFT/ ENGINE	REGN	LOCATION	INJURY
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05 Dec 89      *Bell 206*  
*Jet Ranger*      G-CULL      Nr Norwich, UK      -

While en-route at 300 ft, 90 kts a Common gull (*Larus canus* 420 gm) shattered the left windshield; the wind-blast blew out a side window.

22 Jan 90      *Bell 206*  
*Jet Ranger*      G-CULL      Nr Shepton Mallet,  
UK      -

In cruise at 300 ft and 100 kts, a gull struck the top right hand quarter of windshield making a large hole. Blood and remains entered cabin.

21 October 1990      AS355 Ecureuil 2      OE-FXH      Nr Petronell,  
Austria      -

While en-route at 120 kts, 450 ft during a medical flight the helicopter struck a bird causing a 15 cm hole in the nose and scattering debris in the cabin.

15 Aug 91      *Sikorsky S76*      G-BOND      Aberdeen, UK      -

While en-route at 1,000 ft, 120 kts a gull was seen and avoiding action taken. Unable to avoid it. A fist-sized hole was found in the cockpit roof above co-pilots windshield.

DATE	AIRCRAFT/ ENGINE
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08 Apr 89      Ce

At 90 kts during the take  
unknown.

24 Jun 89      G

While at about 1,000 ft  
leading edge resulting i

05 Sep 89

At 1,500 ft struck Wed  
injury to pilot.

28 Nov 89

At 50 kts during the t  
the windshield causin



**AIRCRAFT OF 5700 KG AND BELOW**

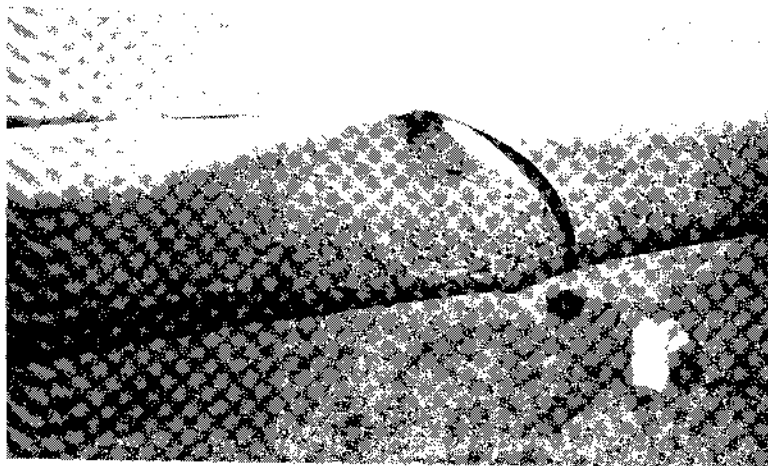
DATE	AIRCRAFT/ ENGINE	REGN	LOCATION	INJURY
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08 Apr 89            *Cessna 402*            *5H-72B*            *Dodoma, Tanzania*

At 90 kts during the take-off run the windshield was broken due to a bird strike. Bird species unknown.

24 Jun 89            *Gulfstream AA5*            *G-BLHD*            *Nr Southampton, UK*

While at about 1,000 ft and 90 kts in the circuit, the aircraft struck a gull which dented the wing leading edge resulting in a large hole at a skin joint.



05 Sep 89            *Cessna 152*            *VH-FUJ*            *Nr Archemfield, Australia*            *1 minor*

At 1,500 ft struck Wedge-tailed eagle (*Aquila audax* 3.5 kg). Windshield shattered causing minor injury to pilot.

28 Nov 89            *Piper PA28*            *XB-ASX*            *Zihuatanefo, Mexico*            *Minor*

At 50 kts during the take-off run the aircraft struck a Buzzard (*Buteo buteo* 800 gm). It penetrated the windshield causing minor injury.

Jul 91

P47 Thunderbolt

Oshkosh, USA

Gull went down carburettor air intake causing loss of power. Just able to glide to airfield.

27 Dec 91 Piper PA31 Navajo 5Y-SRV Masai Mara, Kenya 9 killed

A DC3 had suffered a gear-collapse at the end of its landing run at a game park airfield and the PA31 pilot made a pass over the site (not its destination). The aircraft struck a Vulture which smashed the windscreen killing the pilot. The aircraft crashed killing all occupants. The airfield is approximately 100 miles from Nairobi

28 Dec 91 Beech 200 F-GCTP Paris CDG, France

In climb windshield damaged at 100 ft, 110 kts by Lapwing (Vanellus vanellus 215 gm). Precautionary landing, windshield changed.

1992 SUPPLEMENT

DATE	AIRCRAFT/ ENGINE	REGN	LOCATION	INJURY
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26 Jan 92 Cessna 401 5Y-BGW Masai Mara, Kenya 7 killed

Reported by the pilot of another aircraft, the Cessna pilot made a MAYDAY call that he "had a bird strike and would have to make an emergency landing because he was having trouble maintaining control." The pilot of the other aircraft saw the Cessna go into a spin and explode on impact with the ground. The wing tip and fuel tank were found a considerable distance from the main wreckage. The bird was believed to be a Marabou stork (Leptoptilos crumeniferus 5.9 kg).

11 Feb 92 Enaer Namcu - Nr Santiago, Chile 1 killed

The fourth prototype of the 2 seat trainer was destroyed killing the test pilot while attempting to land following a bird strike.

CORRECTIONS TO B

'Analysis of Bird strikes

Owing to the haste with which it was prepared, the following corrections are made:

P 263 Summary

P 266 Para 3.1 (c)

P 274 Para 4 (a)

P 277 Table 2

P 278 Table 2

P 279 Table 3

P 280 Table 3

P 281 Table 3

P 282 Table 3

P 283 Table 3

P 289 Table 6

P 290 Table 7

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## CORRECTIONS TO BSCE 20/WP28

## 'Analysis of Bird strikes Reported by European Airlines 1981-1985'

Owing to the haste with which the Paper was word processed for the Helsinki meeting, a number of errors crept in as follows:

- P 263 Summary - Para 2 first line, rate should be 5.1 not 5.7
- P 266 Para 3.1 (c) - Line 3, rate should be 5.1 not 5.7
- P 274 Para 4 (a) - Line 2, should be 5.1 per 10,000 movements
- P 277 Table 2 - Boeing 757, all strikes should be 71 not 7 and the strike rate should be 5.9 not 0.3  
- HS Argosy, should in all strikes column be 1
- P 278 Table 2 - HS 748, damage rate should be 0.3 not 0.1  
- Helicopter total is in hours
- P 279 Table 3 - Brussels, total strikes should be 87 not 81  
- Mariehamn, should be damage 2, all 41 - in place of 2  
- Vaasa, total strikes should be 9 not 7  
- Lille, should be 16, 23, 331, 6.9, -, -, 16  
- Hyenes, Octeville, delete entry
- P 280 Table 3 - Le Harve, should be 8, 3702, 21.6, -, -, 8  
- Paris LBG, should have a rate of 8.7  
- Corfu, foreign strikes should be 31 not 29
- P 281 Table 3 - Eindhoven, should be total 4 strikes  
- Maastricht, should be total 3 strikes  
- Under Portugal add:  
Funchal, Madeira, foreign 2, damage 1, total 2  
Lisbon, foreign 30, damage 2, total 30  
- Mahon, foreign 17, damage 1, total 17  
- Delete entry for Minorca  
- Angelholm, total should be 22 not 20  
- Gothenburg, should be 20 not 19  
- Lulea, should have 1 foreign strike
- P 282 Table 3 - Aberdeen, national strikes 46 not 54  
- Guernsey, national 40, total 40  
- Jersey, national 27, total 27  
- Moscow, Sheremetyero, 5 European, nil damaging
- P 283 Table 3 - Dalaman, total 3, damaging nil  
- Kano, total 13, damaging 3  
- Karachi, total 11, damaging 3  
- Las Palmas, damaging 2 not 12  
- Nairobi, damaging 13 not 15
- P 289 Table 6 - Headings should be 'below 110 g', and '110 g to 1.81 kg'  
- Propeller, should be total 104 not 10
- P 290 Table 7 - Headings should be '1.81 kg to 3.63 kg' and 'over 3.63 kg'

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