

Helsinki
21-25 May 1990

SERIOUS BIRDSTRIKES TO CIVIL AIRCRAFT 1987-1989

**John Thorpe - UK Civil Aviation Authority
Safety Regulation Group**

SUMMARY

The Paper contains a sample of detailed histories of accidents and more serious incidents (eg double engine ingestion with damage, holed airframe, fire, windshield damage) for the years 1987 - 1989. The Paper is divided into three sections:-

- Transport Aeroplanes of 5700 kg and over, and Business Jets.
- Aeroplanes below 5700 kg.
- Helicopters.

The incidents have not been analysed although it can be seen that the majority of cases involve engine multiple ingestion including the Ethiopian B737 accident which was the first transport jet fatal accident due to birds. The windshield appears to be the critical area for General Aviation aeroplanes and Helicopters.

The author would welcome any new or additional information as the Paper is mostly from ICAO, UK and Insurance sources.

AEROPLANES OVER 5700 KG AND EXECUTIVE JETS

<u>Date</u>	<u>Aircraft/ Engine</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>
10.02.87	B737 (JT8D)	N-	Chicago, Midway, USA	-	-
During take off run at 140 knots struck gulls, damage to Engine 1 and inlet cowl of Engine 2.					
05.03.87	Bandeirante	NB90AC	Norfolk, Nebraska USA	5	-
Flew through flock of geese at 3000ft during descent, striking 3 or 4. Substantial damage to RH tailplane and fin.					
13.05.87	B747 (JT9D)	N-	NY, JFK, USA	-	-
During approach at 900 ft and 150 knots ducks (Anas sp) struck Engine 1 and 2 and damaged wing leading edge. Engines 1 and 2 replaced.					
13.05.87	B747 (JT9D)	N-	NY, JFK, USA	-	-
At 280 kts and 800 ft birds damaged Engine 3 nose cowl and compressor. Engine 4 nose cowl, fan cone.					
18.07.87	B737 (JT8D)	VT-EHH	Agra, India	-	Minor
At 3500 ft, 250 kts struck a Vulture (Accipitritiformes), co-pilots window shattered, slight injury from glass splinters.					
15.08.87	B747	VT-	Rome, Italy	-	-
On take off struck flock of gulls, ingested in two engines causing fires. Take off abandoned but tyres burst. Airfield personnel extinguished flames.					
16.08.87	B757 (RB211)	G-BIKT	Nr Milan, Italy	-	-
At 300 ft and 150 kts after take off struck birds, smashing nose light and damaging gear up-lock.					
17.08.87	A300 (CF6)	F-BUAP	Chateau-Bougon, France.	-	-
Large flock of Black headed gulls (Larus ridibundus Wt. 275 gm) ingested in both engines at 140 kts on take off. Four fan blades changed in Engine 1 and one in Engine 2.					
25.09.87	B720 (JT3D)	ET-AAH	Bole, Ethiopia	-	-
Flock of doves (Columba sp) ingested in Engines 1 and 2, take off abandoned at 110 kts. Both engines changed.					
29.09.87	B720 (JT3D)	ET-AAH	Bole, Ethiopia	-	-
Flock of doves ingested in Engines 2 and 3, take off abandoned at 90 kts.					
04.12.87	B737 (JT8D)	VT-EGM	Patna, India	-	-
During approach at 1700 ft, 170 kts bird tore through skin of LH tailplane.					
13.12.87	Jetstar (TFE 731)	VR-BJI	Coventry, UK	-	-
At 50 ft on take off, 160 kts, struck flock of Lapwings (Vanellus vanellus at 215 gm). Fan blades damaged on Engines 2, 3, and 4.					
14.03.88	L1011 (RB211)	G-BHBR	Dubai	-	-
Gulls ingested in Engines 1 and 3. Fuselage and landing gear struck. Engine 3, 2 fan blades damaged.					

Passi
Take
lift

08.07.88

B737

Bird
crack

15.09.88

B737

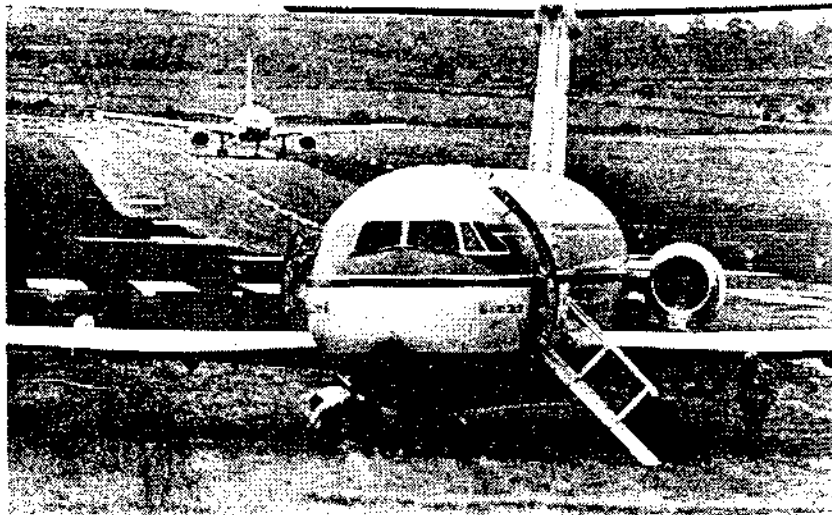
During
end of
strike
EGT, g
return
minutes
in open
disinte

27.06.88

BAC1-11

G-AXBB

Newcastle, UK



Passing through 100 kts flock of birds seen ahead of aircraft, Engine 1 ran down. Take off abandoned at 147 kts (From FDR) $V_1 = 144$. Full reverse and braking but not lift dump used. Over ran by 160 ft. No damage.

08.07.88

B737 (JT8D)

VT-EGI

Bhubaneswar, India

Bird impacted aircraft during climb at 170 kts, 800 ft. No. 4 window inner pane cracked. Returned.

15.09.88

B737 (JT8D)

ET-AJA

Bahar Dar, Ethiopia

104

35 killed
27 serious
42 minor

During take off run at airport 5730 ft amsl crew saw two large birds of prey at far end of runway. Between V_1 and V_R saw pigeons over runway and suffered multiple strikes in both engines. Both engines were surging with loss of EPR and very high EGT, gear was retracted, full power applied and slow climb made for circuit and return. Reached maximum altitude of 7,100 ft and 190 kts. On base leg about 3½ minutes after take off, both engines failed and a forced landing wheels up attempted in open country 10 km SW of airport. The aircraft slid into a small river bank, disintegrated and burned.



An Ethiopian Notam Issued 5th September 1988 (C077) warned of bird hazards, vehicle cleared birds from runway but the Speckled pigeons (Columba guinea wt, 320 gm) may have been alarmed by the Birds of Prey seen by the crew. Airport had 2 or 3 jet movements per week. Believed 10 to 16 birds ingested in each engine causing fan damage. Surging led to subsequent failures.

Date	Registration	Operator	Location	Altitude	Remarks
18.09.88	B737 (JT80)	N197QQ	Vaernes, Norway	-	Climbing through 1000 ft at 190 kts a gull caused a 40 cm crack and some delamination of middle layer of RH front windshield. Returned.
13.10.88	L1011 (RB211)	G-BHBO	Nr Philadelphia, USA	-	At 5,000 ft, 250 kts, struck flock of ducks (Anas sp). Engine 1 TGT rose to 890° accompanied by very severe vibration - Engine shut down. Due to loss of oil on Engine 3, aircraft diverted to New York. Engine 1 was changed due to intermediate pressure compressor damage and subsequent secondary damage. Engine 2 was boroscoped and minor damage was found to an HP6 compressor blade. Nose cowl and fan blades were changed on Engine 3. This engine was removed from service later due to high oil consumption resulting from damage associated with this birdstrike.
24.10.88	B757 (RB211)	D-AMUT	Lanzarote, Spain	-	At 152 kts during the take off run struck a flock of gulls in both engines. Returned for overweight landing, 4 fan blades were replaced in each engine.
25.10.88	B747 (JT90)	AP-BCL	Istanbul, Turkey	433	Struck gulls just after take off, birds were ingested in Engines 3 and 4. 40 tonnes of fuel jettisoned. Lower fuselage damaged, both engines changed.
31.10.88	B747B (CF6)	5R-MFT	Nairobi, Kenya	-	Abandoned take off at 140 kts after birds were struck. 16 flat tyres, all fusible plugs melted.
02.11.88	AN24 (IVCHENKO)	SP-LTD	Rzeszow, Poland	29	1 dead Engine failure following possible birdstrike on final approach. Force landed in field, damaged and caught fire after striking ditch.
07.11.88	B737 (JT80)	LV-JTO	Mar del Plata Argentina	-	At 15 ft just after take off struck flock of brown hooded gulls, (Larus maculipennis). Ingestion in Engines 1 and 2, first and second stage blades and internal damage. Cost 475,000 US Dollars.
16.11.88	A300B (CF6)	D-AHLZ	Munich, Germany	-	During take off run at 140 kts struck flock of gulls damaging fan blades in Engine 1 bird remains in Engine 2. 30 dead birds on runway.
20.12.88	B747 (CF6)	F-GCBK	Paris, CDG, France	-	At 40 ft just after lift off struck Lapwings (Vanellus vanellus at 215 gm). 40 tonnes of fuel jettisoned and returned. One fan blade damaged in Engine 1 and 4 in Engine 3.
20.12.88	B737 (CFM 56)	PH-BDM	Amsterdam, Netherlands	-	During landing flare, 120 kts, struck flock of Lapwings (Vanellus vanellus). Further down runway struck another flock. Both engines boroscoped, reported both damaged
13.04.89	B747	ZS-	Windhoek, S. Africa	360	Abandoned take off run after bird flew into engine. A number of tyres deflated.
25.05.89	A310 (CF6)	VT-	Delhi, India	270	Struck vulture at 4,000 ft shortly after take off. Nose, pressure bulkhead and radar extensively damaged.

31.05.89 B737

07.06.89 BAe

28.06.89 B737

10.08.89 A320 (CF

At r
vibr
fall
Capt
Engi
desc
Offi

At ro
the s

shutdo
strike
Three

Engine
Engine
exchang
Engine
Engine
There w

Flock o
100,000

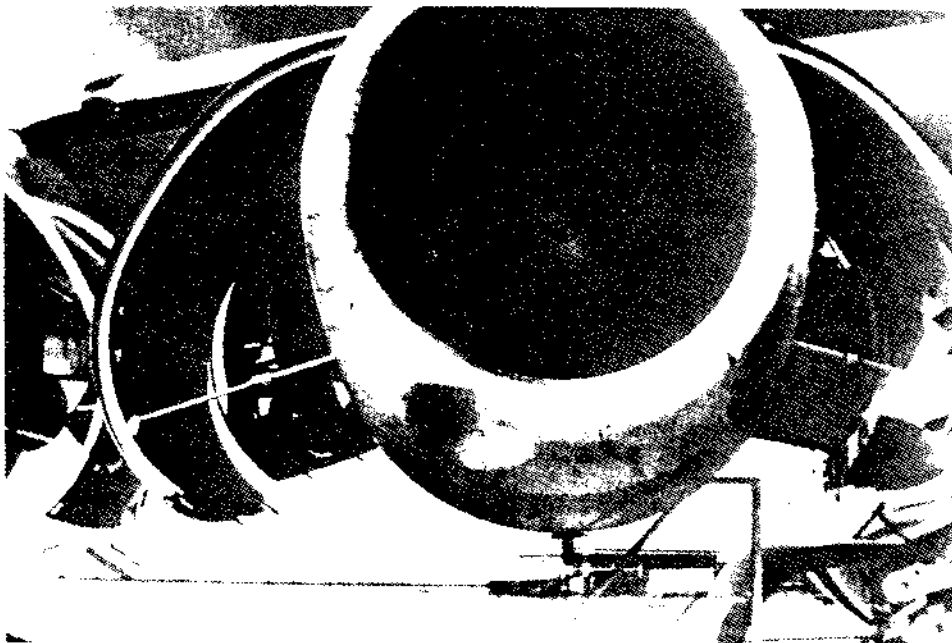
During f
the capt
distorte
Engine 2
flown wi
landing t
feathers
bengalens

31.05.89 B737 (CFM56) G-BNWK Venice, Italy

At rotation multiple gull strikes. Captains 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 Captain's workload First Officer continued Standard Departure. FL100 reached and Engine 1 vibration level increased from 1½ - 2. Decided to return. Captain flew descent, First Officer took over on Finals. Oil contents recovered on Finals. First Officer was on first flight in -400 series.

07.06.89 BAe 146 (Alf 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 the aircraft all over. All engines lost power and No 3



shutdown. Climbed to 1,000 ft for circuit and overweight return. There were 57 strikes to airframe from the Mediterranean Herring Gulls (Larus argentatus wt 1 kg) Three engine nose cowls damaged and all 4 engines changed.

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 bottle 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.

28.06.89 B737 VT Delhi, India Injury

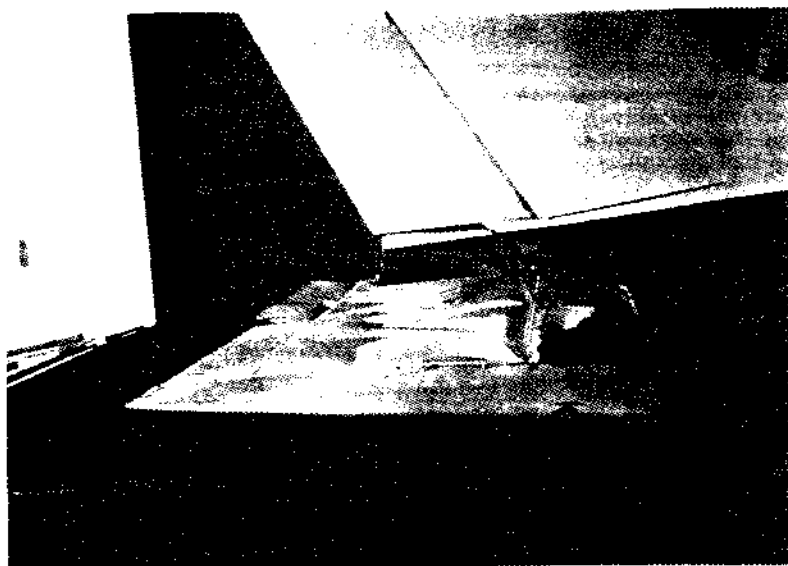
Flock of birds smashed into cockpit injuring co-pilot. Aircraft returned. Cost 100,000 US Dollars.

10.08.89 A320 (CFM56) VT-EPE Delhi, India

During final approach, 2500 ft, 250 kts, a vulture (accipitriforme) 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 4 of the 6 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 wind shield mounting as an Indian white-backed Vulture (Gyps bengalensis wt 4.5 kg).

AEROPLANES OF 5700 KG AND BELOW

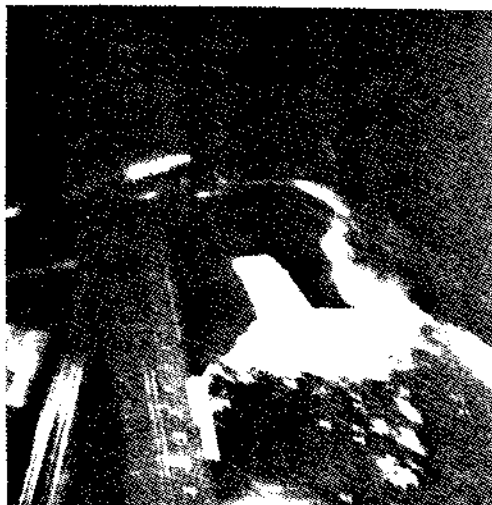
<u>Date</u>	<u>Aircraft/ Engine</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>	<u>HELICOPTERS</u>
11.03.87	C303	G-BJZK	Shoreham, UK	-	-	<u>Date</u> <u>Hel</u>
	Pigeons (columba sp) struck wing jamming flaps in down position.					26.04.87 Boli
13.05.87	NA-680	ET-ADQ	Bole, Ethiopia	-	-	A d
	A bird struck RH side of windshield , destroyed at 500 ft on approach.					28.06.87 Hugi
09.07.87	C210	VH-WRD	Roper Bar Australia	-	Minor	Dur
	A kite (Milvus sp) smashed the windshield on final approach at 600 ft , 90 kts.					30.07.87 Bel
09.08.87	PA25	VH-FAL	Batchelor, Australia	-	Minor	Whi kg) land for
	Struck two hawks shortly after take off while towing glider. One hawk penetrated windshield hitting pilot, speed 50 kts.					
12.09.87	TB10		Kfar-Tavor Israel	-	Minor	
	In cruise at 2500 ft, 110 kts, a Honey Buzzard (Pernis apivorus wt 785 gm) broke windshield and entered cabin , pilot scratched by splinters.					
24.11.87	Osprey Homebuild	VH-LII	Cape Liptrap Australia	-	Destroyed	
	At 70 kts just after take off struck a bird, shattering windshield, pilot vision pilot vision impaired by wind blast. After landing and shutting down found back of aircraft on fire, vacated before aircraft was destroyed. Believe bird damaged fuel line allowing fuel to spray on hot exhaust.					
02.08.88	Beech 58	F-8XDP	Medis, France	-	Minor	
	Just before landing , at 20 ft and 110 kts, the windshield was smashed by a Herring Gull (Larus argentatus wt. 1 0 kg)					
28.09.88	C207	VH-MIV	Nr Denpelli Australia	-	Minor	
	While en route at 650 ft pilot saw bird just before impact. Windshield penetrated striking					06.06.88 Boli05
						At 11 oil co
						10.07.88 AS365
						Lapwin



Canadian Incident:
Cessna Tailplane
struck by American
Eagle (Haliaeetus
leucocephalus
wt 5.1 kg)

HELICOPTERS

<u>Date</u>	<u>Helicopter</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>
26.04.87	Bo105	D-HAYA	Nr Coblenz Germany	-	-
A dove (columba sp) broke windshield , 105 kts at 800 ft.					
28.06.87	Hughes 500	G-TMJH	Booker, UK	-	-
During approach a swallow (Hirundinidae) damaged windshield					
30.07.87	Bell 212	G-BFER	Nr Unst, UK	-	Minor
While on finals at 300 ft and 105 kts at dusk struck a Gannet (Sula basana wt. 2.9 kg). Top RH corner of Captain's windshield penetrated and entered cockpit. Co pilot landed helicopter as Captain's screen obscured. Crewmen required medical attention for glass particles in eye.					



06.06.88	Bo105	G-BE2T	Nr Tingwall, UK	-	-
At 110 kts, 1000 ft struck gull smashing one overhead perspex panel. Some remains in oil cooler.					
10.07.88	AS365 Dauphin	G-BLUN	Oil Rig, UK	-	-
Lapwing caused 20 mm long by 5 mm deep gash on top edge of rotor tip.					

END