

**Serious birdstrikes to civil aircraft
1985 to 1987**

(John Thorpe, UK)

SERIOUS BIRDSTRIKES TO CIVIL AIRCRAFT 1985 TO 1987

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Safety Data & Analysis Unit

S U M M A R Y

The Paper contains a sample of detailed histories of accidents and more serious incidents (e.g. double engine ingestion, holed airframe, fire, uncontained engine failure) for the years 1985 to 1987. The Paper is divided into three groups:

- Transport Aircraft over 5,700 Kg and Executive Jets
- Aeroplanes of 5,700 Kg and below
- Helicopters

No attempt has been made to analysis the information although it is apparent that for transport aircraft as before, the critical area is engines (27 out of 46 incidents in the paper) and for light aircraft and helicopters the windshield may be the critical area. As far as is known during this period there have not been any hull losses.

The author would welcome any new or additional information as the paper relies heavily on UK and ICAO information.

AEROPLANES OVER 5700KG AND EXECUTIVE JETS

<u>Date</u>	<u>Aircraft</u>	<u>Regn</u>	<u>Operator</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>
11.01.85	B737(JT8D)	G-BGDO	British Airways	Aberdeen, UK	120	Nil
<p>During the approach at about 200 ft and 130 knots the aircraft passed through a flock of Lapwings (Vanellus vanellus) it rose from fields near the airport. Both engines, radome, windscreen, wings and fuselage were struck. 4 fan blades were shingled in engine 1 and 1 fan blade shingled in engine 2.</p>						
17.02.85	A300B(CF6)	F-BUAM	-	En-route in France	-	-
<p>At 2300 ft and 240 knots a Greylag goose (Anser anser, 3.3 Kg) was ingested by No 1 engine. There was fire and the engine was shut down and the aircraft re-routed to Toulouse. 21 blades were damaged and the aircraft was out of service for 53 hours.</p>						
18.02.85	DC8-70(CFMS6)	CF-TIS	Air Canada	Brussels	-	-
<p>At 145 knots during take off, birds (gulls) were ingested in engines 3 and 4 and the take off was abandoned. One tyre blew.</p>						
16.04.85	DC3	G-AMCA	Air Atlantique	Nr Luton, UK	-	-
<p>At about 1000 ft and 120 knots during the approach, birds struck the windshield causing a crack in both the inner and outer panes.</p>						
16.04.85	B737	-	Far Eastern Transport	Taipei, Taiwan	93	Nil
<p>The aircraft skidded off the runway during take off after a bird struck the right hand engine.</p>						
27.05.85	DC9(JT8D)	CF-TMX	-	Toronto	-	-
<p>One blade on each of No 1 and No 2 engines was found to be damaged.</p>						
30.06.85	B727	D-ABKE	Lufthansa	Boukhalf, Morocco	-	-
<p>During the take off run 100+ pigeons were struck. The auxiliary and No 2 pitots were blocked by bird remains and the pilots airspeed and mach indicator became unserviceable. Fuel was jettisoned and the aircraft returned for a precautionary landing. The landing lights were found to have been destroyed.</p>						
06.07.85	BAE146	N-	-	Nr Los Angeles, USA	-	-
<p>Whilst climbing through 7000 ft at 250 knots a flock of gulls broke the right A windshield.</p>						
14.07.85	B747(JT9D)	-	-	Heathrow, UK	-	-
<p>At about 100 ft and 180 knots in the climb a flock of pigeons were ingested in engines 1 and 2 resulting in blade, spinner and nose cowl damage.</p>						
28.07.85	B747(CF6)	N-4548M	KLM	Amsterdam, Netherlands	-	-
<p>At 130 knots during the take off run a flock of pigeons were struck resulting in the take off being abandoned. First row of fan blades were badly damaged, the N1 sensor was struck by a large piece of fan blade which exited through the fan cowl causing a large hole. The tail cone was torn off and the abradable seal was gone. Trailing edge flaps were damaged by pieces of blade.</p>						
29.07.85	B747 (R8211)	-	Air New Zealand	Christchurch, New Zealand	370	Nil
<p>At Flotation on take off birds were ingested in three engines. Two were shut down shortly afterwards, the aircraft climbed on three engines before a second engine was throttled back. Fuel was jettisoned prior to landing. Two engines were removed, one having fan blade and duct damage. The birds were oyster catchers (Haematopus ostralegus weight 500 gm).</p>						
31.07.85	B727	N856	-	Green State, USA	-	-
<p>During the landing roll at 125 knots a flock of birds punctured the wing leading edge. Three dead birds were found inside the wing and the wing tip was also damaged.</p>						

13.08.85 B747SP(JT9D) HL-7457 Korean Airlines Kimpo, Korea
 Take off was abandoned at 130 knots after a flock of birds were ingested in engines 2 and 3. 2 fan blades were replaced on engine 2 and 3 fan blades in engine 3.

18.08.85 DH66 - - New London, USA
 A Canada Goose bent one propeller after it was struck during the landing roll at about 65 knots.

28.08.85 B727 - - Green State, USA
 At 120 knots during the take off run a Canada goose (Branta canadensis, 3.6Kg) struck the wing leading edge breaking two slats. Take off was abandoned, resulting in blown tyres.

02.09.85 B737(JT8D) C-608D - Baie-Comeau, Canada -
 At about 50 ft and 140 knots, a flock of gulls was struck damaging the left stabiliser and wing leading edge. Engine 2 was also struck and the airframe was holed. 23 birds struck the aircraft. An immediate return was made.

13.09.85 B747 - - Grant County Airport, USA
 A flock of birds damaged engines 1 and 2.

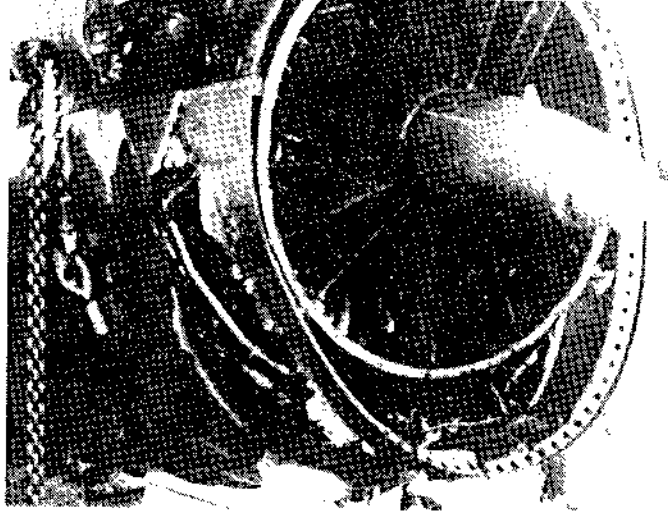
24.09.85 Fokker F28 - - Durham, USA
 Whilst approaching the airport at about 2000 ft a flock of birds damaged the radome, antennae and pressure bulkhead.

01.11.85 Fokker F27 VT-DMV - Lilabari, India
 At 1500 ft during the approach at a speed of about 170 knots, a large vulture was struck which damaged the right wing outboard of the landing light causing a heavy fuel leak.

15.11.85 DH66 - - Mr Republic, USA
 During the climb at about 170 knots a flock of geese left a large gaping hole in the outboard left wing.

01.12.85 L1011 - - Lambert - St Louis, USA
 During the take off run a flock of birds damaged the left landing light shattering the lens and bucket pushing it back into a hydraulic line causing failure of the line and system A. There was heavy nose cowl damage to engine 3.

07.12.85 B737(JT8D) EI-ASA Aer Lingus Dublin, Ireland NII
 At 50 ft after take off a flock of gulls were struck. No 1 engine surged and throttle lever slammed rearward by itself passing the detent and unlocked the thrust reverser. The engine was shut down and a single engine landing was made. No 1 engine nose cowl was missing. 8 first stage fan blades were liberated and the inlet case and both front and rear fan containment cases had major penetrations. 2 of the 3 engine mount bolts were fractured and the engine was attached by the front left cone bolt and flexible hydraulic lines at the rear of the engine. Bird remains were found in the fan discharge duct, left hand main gear well and outboard trailing edge flaps of the right hand wing. Engine 2 had some damage from parts which may have bounced off the runway, and the leading edge of the horizontal stabiliser was changed as well as the radome. A cockpit side window outer pane was also damaged. A total cost was approximately 3.5 million dollars. The birds were black-headed gulls (Larus ridibundus).



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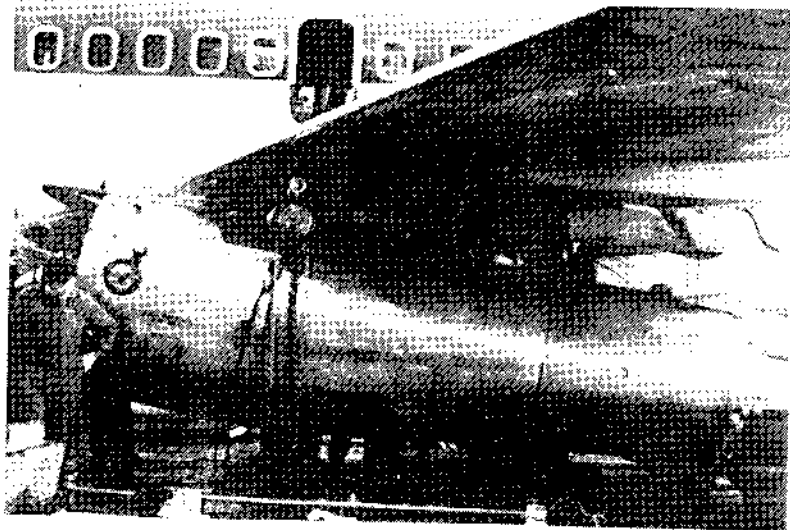
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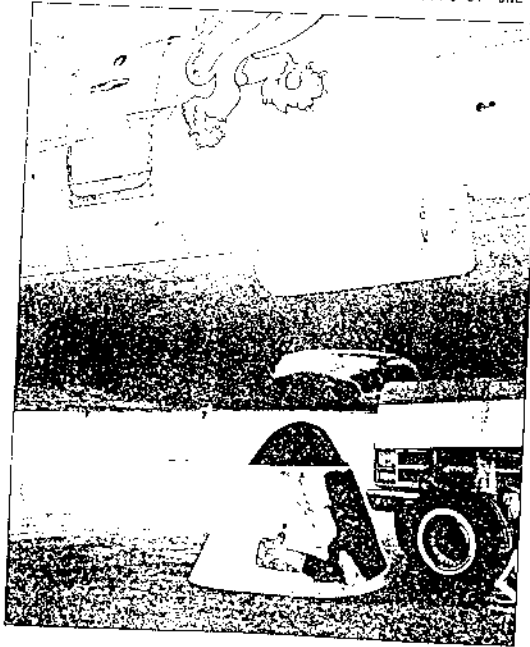
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- 21.12.85 B727 F-8PJP Air Italia Milan Linati Italy - -
 At 30 ft during the approach engines 2 and 3 ingested Black headed gulls. Boroscope inspection necessitated changing a compressor blade on engine 3.
- 30.12.85 B737 ZS-SBO SAA East London, South Africa - Nil
 The aircraft returned after a blue crane (Anthropoidese paradisea weight 3.5 kg) was ingested in Engine 1. The majority of fan blades were broken or liberated and several bolts were broken at B flange. Oil tank was detached from its mount.
- 01.01.86 Boeing 737(JT8D) EI-8EC Aer Lingus Dublin, Ireland - -
 At 130 knots during the take-off run a flock of lapwings was ingested in Engine 2. The take off was abandoned and the aircraft stopped 200 metres from the end of the runway. Some damage was found to Engine 2.
- 12.02.86 Boeing 707 - - Nairobi, Kenya - -
 At 300 feet after take-off an engine ingested a bird. The engine caught fire. The aircraft returned and ground personnel extinguished the fire.
- 07.03.86 Boeing 737 C-GNDW - Toronto, Canada - -
 Collision at 2500 and feet and 240 knots with birds of unknown species smashed a landing light, bent a frame, skin and internal wing structure, and cracked No 3 leading edge flap.
- 07.04.86 Boeing 747(RB211) G-BDXH British Airways En route in Middle East -
 A collision with cuckoos (Cuculus 100gm) damaged the radome and front pressure bulkhead. Intermittent picture on both radar systems during descent and approach.
- 07.04.86 Boeing 747(CF6) PH-BUN KLM Amsterdam, Netherlands -
 During the climb at about 800 feet a high power stall occurred on Engine 3. Fuel was jettisoned and the aircraft returned. The fan was found to be heavily damaged; the nose cowling, fan reversers and fan doors were also damaged and the exhaust cone missing. Bird species unknown.
- 10.04.86 Boeing 737(JT8D) YT-EFL - Raipur, India - -
 At about 2800 feet and 245 knots during the approach a vulture struck the wing leading edge causing a 35cm x 35cm hole between the wing root and the right engine. The trailing edge flap was slightly damaged.
- 30.04.86 Boeing 737(JT8D) YT-EAG - Delhi, India - -
 At 800 feet and 150 knots on the approach the windshield on the captain's side was shattered after striking a bird of unknown species.

Date	Aircraft	Operator	Location	Remarks	Date	Aircraft
02.05.86	Fairchild 227	N-	Rapid City, US	During the approach at 180 knots a flock of eagles caused extensive damage to leading edge of the right wing between the fuselage and engine and to the leading edge of the right horizontal stabilizer.	-01.88	Boeing
22.05.86	Boeing 747(JT9D)	N-	JFK, New York	During the approach birds damaged Engines 2 and 3. An engine or engines were shut down.		An ea press out w Number
28.05.86	Boeing 737(JT8D)	AP-BCB	Chaklala, Pakistan	The ILS glideslope antenna mount was damaged, radar hinge bracket bolts sheared, small hole in the fuselage skin and honeycomb structure of radome separated after striking birds on the approach.		
15.06.86	A300B(CF6)	VT-EFW	Bombay, India	Pigeons were ingested in both engines, resulting in fan blade damage to both engines. A precautionary landing was made.		
10.07.86	A300B(CF6)	F-BUAK	Air Inter Nice, France	At 130 knots during the take-off run a flock of Herring gulls (Larus argentatus) was struck resulting in a precautionary landing. In Engine 1 seven fan blades required replacement and in Engine 2 two fan blades required replacement. There was damage to the wing leading edge.		
20.07.86	B737	C-GQBH	Quebec Air Warbush, Newfoundland 63	The aircraft was substantially damaged when it over ran the runway on take-off. Some passengers sustained slight injuries during the emergency evacuation. It is understood that during the take-off run the aircraft encountered a flock of birds which were ingested into the left hand engine. The abandoned take-off was on a runway described as slippery following heavy rain resulting in the over-run into soft ground.		
14.09.86	Boeing 747(JT9D)	CF-TOE	Air Canada Tessera, Italy	Birds of unknown species were ingested in Engines 3 and 4 at about 50 feet during the climb. Fuel was jettisoned and a precautionary landing made. Seven birds were struck. The aircraft returned to service.		
22.10.86	Boeing 720(JT3D)	9H-AAO	Air Malta Luqa, Malta	At about 50 feet and 145 knots in the climb the aircraft struck a flock of starlings. All parameters were normal but at flight level 390 Engine 4 stalled, stalled again and after a second restart attempt the flight descended to flight level 350 but the engine would not run above 1.4 e.p.r. The flight returned. It was found that Engine 3 had minor fan blade damage and Engine 4 had extensive fan blade damage and was replaced.		<u>AEROP</u>
31.10.86	Boeing 747(JT9D)	SR-MFT	Air Madagascar Rwanda, Kanombe	Black Kites (Milvus migrans) were struck at 130 knots during the take-off run. A precautionary landing was made. Two fan blades were damaged in Engine 2 and four fan blades in Engine 3.	09.03.85	Mooney
11.11.86	Jetstream 31(TPE331)N-	-	Colombus, US	During the take-off run a flock of doves was struck causing damage to Engines 1 and 2 and to the wing.	03.07.85	Cessna
22.11.86	Boeing 737(JT8D)	AP-BBC	Lahore, Pakistan	Birds of unknown species were struck during the climb causing damage to three fan blades in Engine 1 and to nine fan blades in Engine 2.		Aircraf go-arou on his was str of bird landed identif
21.12.86	DHC-8	N-	Nr Philadelphia, US	While en route at 9500 feet and 210 knots a bird of unknown species struck the windshield causing a crack and complete electrical failure. Engine 1 was lost.	16.08.85	Gulfstr
05.03.87	Bandeirante	N89QAC	Norfolk, Nebraska, US 5	The aircraft flew through a flock of geese at 3000 feet above mean sea level during the descent and was struck by three or four. There was substantial damage to the right horizontal stabilizer and to the vertical stabilizer.	17.09.85	MS890 R
15.08.87	Boeing 747	-	Air India Rome, Italy 347	Flock of gulls collided with the aircraft on take-off and were ingested into two engines causing fires. Take-off was abandoned but tyres caught fire. Airfield personnel extinguished the flames.	18.09.85	Cessna 3
					12.10.85	Mooney M
						While at the airc section

An eagle hit the radome as it was descending through the radome penetrating the pressure bulkhead and coming to rest against the wall behind the engineers seat, tearing out wiring looms, the co-pilot's left rudder pedal severely damaging the co-pilot's left leg. Number 3 engine also sustained foreign object damage as a result of the impact.



AEROPLANES OF 5700 KG AND BELOW

<u>Date</u>	<u>Aircraft</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>
09.03.85	Mooney M20	VH-MV0	Hockston Park, Australia	-	-
While in the cruise at 1500 ft and 140 knots the wing leading edge was badly damaged when the aircraft struck a flock of hawks.					
03.07.85	Cessna F152	G-BKGM	Sywell, UK	1	-
Aircraft was being flown by student, returning on completion of cross country. Pilot made two go-arounds due to presence of flock of birds on runway. ATC advised birds would move out of way on his landing run. Pilot began final approach. Pilot stated that prior to touch down aircraft was struck by birds on the windscreen, wing and strut. He stated he was distracted as a flock of birds rose around him causing him to land the aircraft heavily. It bounced 10 to 15 feet and landed heavily on the nosewheel which collapsed causing propeller to strike the ground. Birds identified as rooks and some remains found where aircraft came to rest.					
16.08.85	Gulfstream AAS	-	Nr Montgomery, USA	-	-
While cruising at 1500 ft and 105 knots the aircraft struck a buzzard destroying the right wing route and damaging a fuel line from the right wing tank.					
17.09.85	MS890 Rallye	SEGFA	Nr Yasterlk, Sweden	-	-
While cruising at 105 knots at 1000 ft a 20 cm hole was made in the windshield after the aircraft struck a bird of unknown species.					
18.09.85	Cessna 310	-	Carrasco, Uruguay	-	-
At 3500 ft and 140 knots on the approach the wind shield was broken on the left side with inward separation fragments and frame denting after a bird struck the aircraft.					
12.10.85	Mooney M20	-	Nr Ocean City, USA	-	-
While at 2000 ft on the approach at a speed of 120 knots the pilot heard a loud explosion and the aircraft went into a dive. He made an emergency landing at Ocean City and found the tail section twisted and bent with substantial damage due to a bird strike.					

HELICOPTERS



1 Nil

16.10.85	Cessna 150	G-BCKU	Perth, UK			
A Greylag goose (Anser anser weight 3.3 Kg) struck the pilot tube tearing the wing skin. Incident was at 600 ft and 70 knots.						
11.11.85	Cessna 402	YH-AHO	Batchelor, Australia			
Just after take off the aircraft struck a Wedge tailed eagle (Aquila audax weight 3.5 kg) causing severe damage to the leading edge of the fin. A precautionary landing was made.						
18.01.86	Beech 90	G-KFIT	Edinburgh, UK	-	-	
At 100 knots during the take-off run a flock of Black headed gulls (Larus ridibundus) was struck. The structure of the nose was deformed and the radars damaged necessitating a change. Other birds involved were Common Gulls and Herring Gulls.						
02.04.86	Fiber PA28	N-	near Madison, Wisc, US		Minor	
While en route at 3300 feet a flock of Ducks penetrated the windshield causing facial cuts to the pilot.						
22.04.86	Socata TB20 Trinidad	F-6DNA	Vias, France	-	-	
At 60 knots during the landing roll, a little Bustard (Otis tetrix weight 800gm) struck the wing leading edge holed the fuel tank causing a leak.						
25.05.86	SE260	I-LELO	near Alghero, Italy	-	-	
At 4500 feet and 120 knots a bird of unknown species struck the windshield causing penetration and a hole of about 5cm diameter. A precautionary landing was made.						
21.06.86	Falco FB	G-OCDS	Isle of Wight, UK	-	-	
While practising for an air race at 500 feet and 140 knots over the water, a bird entered the carb air intake and lodged in the carburettor throat totally blocking the air to the engine and causing engine failure. The pilot was able to glide to a nearby beach and make a gear-up force landing, the aircraft stopping a few inches from the rocks at the base of a cliff. The bird was a Belgian racing pigeon.						
24.07.86	Cessna 152	G-BHDR	Dundee, UK	-	-	
While at 100 feet and 90 knots on the approach a pigeon broke the windshield causing a large section to almost separate from the aircraft.						
23.08.86	Saab 91	SE-IRM	near Lund, Sweden	-	-	
Whilst en route at 700 feet and a 115 knots a bird of unknown species struck the link at the upper nose leg attachment causing it to fail on touchdown. As a result there was damage to the nose, propeller, exhaust and fuselage and possible crank shaft damage to the engine.						
06.10.86	Cessna 150	5Y-ATB	near Wilson, Kenya	-	-	
Whilst en route at 90 knots and 6300 feet a bird of prey struck the wing raising damage to the outboard section of the tip resulting in lever arm damage to the rear spar of the wing. Estimated cost of repair 60,000 Kenya Shillings. Replacement wing probably required.						

22.08.85 Bell 206
While en route was not

08.10.85 Bell 206
Whilst en route

03.01.86 SA365
At 300 feet system

31.03.86 Hughes 500
Fifty feet resulting

13.06.86 Agusta 269
Whilst en route the pilot nose and

13.07.86 Hughes 500
Whilst en route causing had to change wind blast

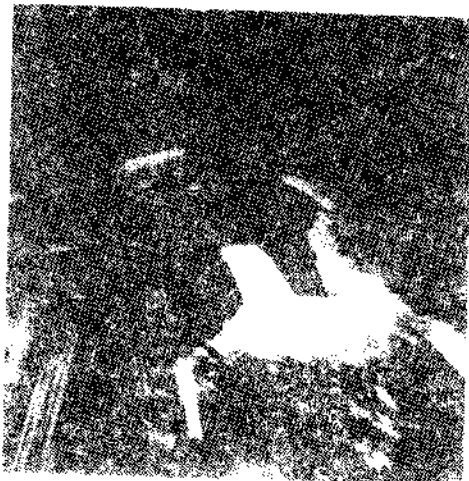
24.09.86 SA341
At 500 feet 70gm) resulting

07.11.86 Bell 206
Gulls penetrated

30.07.87 Bell 212
While on route was seen approach windshield, totally stalled suffered sm

HELICOPTERS

- 22.08.85 Bell 206 - - - - -
 Nr Venice, Louisiana, -
 USA
 While on route at 110 knots and 800 ft a flock of gulls penetrated the pilots wind shield, he was not injured.
- 08.10.85 Bell 206 - - - - -
 Arancus City, USA
 Whilst climbing out at 75 knots a gull broke the left lower pilots wind shield.
- 03.01.86 SA365 G-BFVY - - - - -
 Blackpool, UK
 At 300 feet and 100 knots in the climb the helicopter struck a Black headed gull causing the pitot system to be torn off and the helicopter to return for a precautionary landing.
- 31.03.86 Hughes 500 N- - - - -
 Lunken, US
 Fifty feet in a climb the helicopter struck a flock of Starlings causing damage to the oil cooler resulting in the engine overheating, cracking the lower windshield and causing numerous dents.
- 13.06.86 Agusta 206 G-BCMM - - - - -
 St Bede, Cumbria, UK - Minor
 Whilst on route at 600 feet and 110 knots a Herring gull holed the windscreen, bounced off the pilot's head and struck the roof window which broke. The pilot suffered slight cuts to the nose and head. A precautionary landing was made.
- 13.07.86 Hughes 500 G-GASC - - - - -
 near Biggin Hill, UK -
 Whilst en route at 500 feet and 90 knots the helicopter hit a flock of Swifts (Apus apus wt 40gm) causing a hole in the windshield. Live Swift was flying around inside the cockpit and the pilot had to contend with alarmed passengers the bird flying around inside together with coping with the wind blast and noise from the hole. A precautionary landing was made.
- 24.09.86 SA341 F- - - - -
 Marignane, France -
 At 500 feet and 125 knots the helicopter struck a flock of Nighthawks (caprimulgus europaeus wt 70gm) resulting in the windshield being penetrated. The carcass struck the rear bulkhead.
- 07.11.86 Bell 206 N83086 - - - - -
 near JFK, New York - Serious
 Gulls penetrated the windshield resulting in a precautionary landing. Serious injury resulted.



- 30.07.87 Bell 212 G-BFER Bristol - - - - -
 near Hinst, UK Minor
 While on long final approach at 300 feet and 105 knots at dusk, a Gannet (Sua basana wt 2.5kg) was seen approximately 100 yards ahead. The Gannet hit the top right hand corner of the Captain's windshield, penetrating the glass and splattering into the cockpit. The pilot's windshield was totally shattered so the co-pilot took over and landed the helicopter. The pilot's windshield was totally shattered so the co-pilot took over and landed the helicopter. A crewman in the rear suffered small glass particles in his eye requiring medical attention.