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AD-P004 199	Effectiveness of an Overhead Wire Barrier in Detering Gulls from Feeding at a Sanitary Landfill.
AD-P004 200	Effectiveness of an Overhead Wire Barrier System in Reducing Guil Use at the BFI Jedburg Sanitary Landfill, Berkeley and Dorchester Counties, South Carolina.
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ACCIDENTS AND SERIOUS INCIDENTS TO CIVIL AIRCRAFT
DUE TO BIRDSTRIKES

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ABSTRACT

The Paper contains detailed histories of accidents and serious incidents e.g. double engine ingestion, holed airframe, for the years 1981 to 1983. An attachment contains a summary of all fatal accidents due to bird strikes between 1912 and 1980. The paper is divided into three groups;

- (1) transport aeroplanes over 5700kg (12,500lb) and executive jets,
- (2) aeroplanes below 5700kg, and
- (3) helicopters,

No attempt has been made to analyse the information although it is apparent that for transport aeroplanes the critical area is engines and for light aeroplanes and helicopters the windshield may be critical. ↗

INTRODUCTION

Surprisingly the first fatal accident caused by a birdstrike was when a Wright Flyer crashed after striking gulls in 1912. Since then there are known to have been 18 fatal accidents to civil registered aircraft and at least 34 aircraft destroyed. It is likely there are more, as information is only accurate for about the last 20 years. Of these fatal accidents, 5 involved public transport aircraft and 13 involved general aviation aircraft.

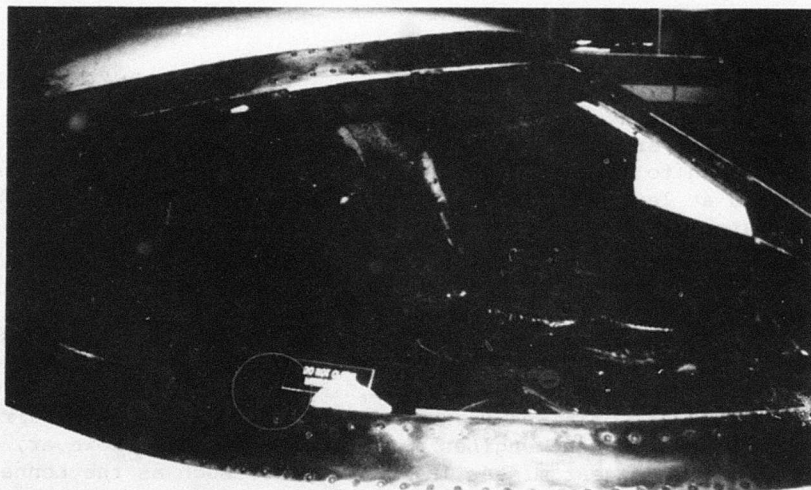
The number of fatal accidents to transport sized aircraft is thus quite modest, and there have been no fatal accidents involving jet airliners. The increased awareness of the problem, implementation of proper measures at a growing number of airports around the world, and tougher airworthiness criteria for aircraft and engines may account for this. However, there have been some very near misses in recent years such as the Kennedy Airport DC 10 and Belgian Boeing 737 write-offs when the occupants all escaped from the burning aircraft. There have also been many cases of multiple engine damage, fortunately with just sufficient power to return, or runway length in which to stop.

The author would welcome any new or additional information.

Serious Incidents to Aeroplanes over 5700kg together with Executive Jets

<u>Date</u>	<u>Aircraft</u>	<u>Regn</u>	<u>Operator</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury to Occupants</u>
15.2.81	Fokker F28	VH-	-	Derby Australia	-	Nil
During take-off run struck a Nankeen night-heron (Nycticorax caledonicus weight 750gm). Take-off was abandoned after an uncontained failure of engine 1. Compressor case holed by 2 blades, but cowling not penetrated.						
25.2.81	DC10	N-	-	New York JFK	-	Nil
During climb a flock of gulls was ingested in engine 2 & 3. There was medium damage to engine 2 and major damage to engine 3.						
25.3.81	B707(JT3D)	-	-	Kanombe, Rwanda	-	Nil
During landing birds of prey were ingested in engine 1 and 2. Aircraft was immobilized by engine damage.						
29.3.81	B727	N-	-	Nr New York JFK	-	1 Minor
During climb at 3,500ft geese were struck, inner and outer panes of first officers windshield shattered, but bird did not penetrate. First officer received facial cuts from glass fragments. Left wing holed.						
7.4.81	Lear 23	N400PG	Private	Lunken Executive Cincinnati, USA	2	1 Killed 1 Minor

The aircraft was in a climbing turn at about 4000ft when the aircraft struck a Common Loon (Gavia immer weight 3.7kg). The bird penetrated the right windscreen and killed the co-pilot. Windscreen debris damaged No 2 engine which had to be shutdown. The pilot's arm was badly cut but a safe landing was made using the emergency brake chute and with no flaps. The weather was good, the flight being at 11.35 local time. The pilot did not see the bird. The Lear 23 is of an age such that the windscreen was not required to withstand a bird of even 4lbs.

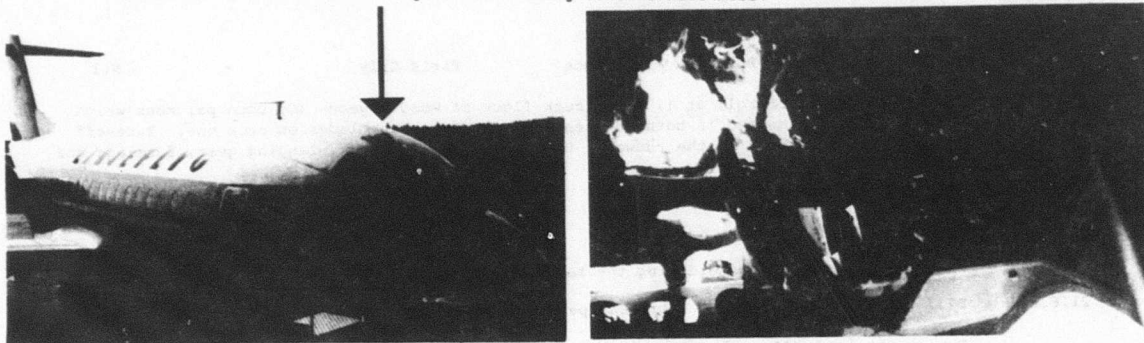


18.4.81	NAMC YS11A	N173RV	Sced Pax	Sand Point, Alaska	39	Nil
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The aircraft was on short finals when a gull struck the windshield centre post, the remains seriously reducing the pilots vision. The pilot misjudged distance and altitude, the main gear impacted an embankment on the approach, both main gear wheels were knocked off and the aircraft came to rest 1500ft beyond the threshold. The damage was substantial.

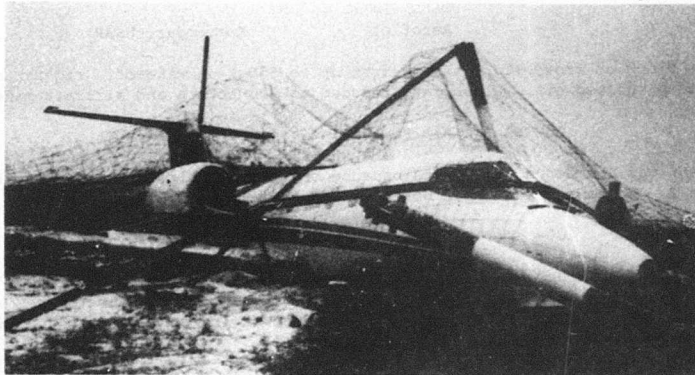
6.5.81	A300B	F-BGEB	Air France	Paris Orly	-	Nil
<p>During the take-off roll at 110kts struck flock of wood pigeons (Columba palumbus weight 460gm). Birds ingested in both engines damaging four fan blades on each one. Take-off abandoned and stopped on the runway. Birds also struck wings, landing gear, fuselage and empennage.</p>						
24.5.81	B737	-	-	Johor Bahru, Malaysia	-	Nil
<p>Both engines were damaged during the take-off run.</p>						
21.6.81	B737	G-BMHG	Air Europe	Naples, Italy	-	Nil
<p>During the take-off run a flock of birds was seen to land on the runway about 100 yds ahead of the aircraft. The birds, pigeons (Columba sp) took off just before the aircraft reached them at about 120 kts (V₁ 125). Several impacts were felt so the take-off was successfully abandoned using reverse thrust and brakes. Later some fusible plugs blew. There was birdstrike damage to the nacelles, nosewheel steering cables and to both engines. Six LP compressor blades were damaged in No 1 engine and 5 in No 2 engine. Both engines were changed.</p>						
4.7.81	DA01 Mercure	F-BTTG	Air Inter	Ajaccio Corsica	-	Nil
<p>During the climb at 3000ft 250kts the outer windshield was shattered after a violent bird impact.</p>						
6.7.81	DC10-30	N112WA	World Airways	Gatwick UK	-	Nil
<p>At rotation on take-off flames and smoke were seen from engine 3 and the aircraft returned with the engine shutdown. The runway was inspected and 80 or more pieces of engine were found, together with some bird remnants. The bird remains were identified as either Feral or Wood Pigeon. (Columba sp of weight 400 to 500gms). The engine was seriously damaged with holed casing.</p>						
20.7.81	DC8-62	-	-	Thesalonika, Greece	-	Nil
<p>Take-off was abandoned after striking pheasants (Phasianus colchicus weight 1.2 kg) on take-off. There was severe damage to engines 2 and 3. Repair cost was 145,000 US dollars.</p>						
8.8.81	L1011	G-BEAK	British Airways	Larnaca Cyprus	347	Nil
<p>On take-off there was a loud bang at 90 kts, so the take-off was abandoned. Evidence of bird ingestion in engines 1 and 3. Ground run revealed power loss on engine 3. Aircraft ferried to base.</p>						
19.8.81	DC3	ET-ABY	Ethiopian Airlines	Jimma	-	-
<p>Aircraft suffered a birdstrike causing wing leading edge skin damage and five broken or cracked ribs.</p>						
29.8.81	B747SP	-	-	Wellington NZ	-	Nil
<p>During take-off struck flock of gulls. Uncontained failure on engine 1. Aircraft diverted to Auckland.</p>						
1.9.81	Fokker F28	SE-DGC	Linjeflyg	Near Ornskoldsvik Sweden	-	Nil

While flying at 8000ft and slightly above 300 kts the aircraft struck an Osprey (Pandion haliaetus, weight 1.5 kg). The bird penetrated the skin above the windshield damaging frames, looms etc and entered the flight deck causing considerable mess.



12.9.81	B747	-	-	Delhi, India	-	Nil
During approach struck vultures (Cathartidae). Engine 2 suffered uncontained failure holing No 2 fuel tank as a result of flying debris.						
24.9.81	B737	-	-	Nagaya, Japan	-	Nil
Abandoned take-off after gulls were ingested in both engines. Blade damage was found in both engines.						
16.10.81	A300B	F-	Air Inter	Paris, Orly	-	Nil
During approach at 150ft and 130kts struck a flock of Stock Doves (Columba Oenas weight 350gm). Birds ingested in both engines.						
19.10.81	DC8-50	-	-	Makurdi, Nigeria	-	Nil
Engines 1, 2 and 4 ingested birds when the aircraft struck a flock during the take-off run. Landing gear and lights also struck. Two engines repaired at base, once changed.						
19.10.81	A300B	F-	Air France	Tunis	-	Nil
Struck flock of birds at 150 kts during take-off run. Both Engines, Fuselage and wing struck. Three fan blades were damaged.						
23.3.82	B747 (JT9D-7)	VT-EFJ	Air India	Jeddah, Saudi Arabia	-	-
During the approach the aircraft passed through a flock of birds causing the pilot to shutdown No 1 engine and bring No 2 back to idle. After touchdown No 2 was shutdown due to vibration. Both engine nose domes and all fan blades were damaged. There were holes in the nose cowl of No 2 engine and the tail cone was missing.						
19.6.82	DC8-63	-	-	Yesilkoey, Turkey	-	Nil
Gulls ingested in engines 3 and 4 during landing run. Both engines changed.						
11.7.82	B747 (JT9D)	G-AWNA	British Airways	Melbourne, Australia	91	Nil
At about 75ft on take-off the aircraft struck a flock of birds, loud bang from engine 3 which ran down and was shutdown with high JPT. Engine 4 vibration warning came on so was throttled to idle. Made immediate return, engine 4 shutdown after landing. Birds were racing pigeons (Columbia livia, wt 250 gm) released 100 miles away and returning to Melbourne. Believed 3-4 birds in engine 3 and 2-3 in No 4. The aircraft was at a very light weight. Both engines changed.						

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|--|--------------|--------|-----------------|---------------------------|-----|-----------|
| 1.9.82 | B737 | G-BGDE | British Airways | Turin, Italy | - | Nil |
| <p>During the take-off 07.20 hrs the aircraft passed through a flock of gulls at 50ft. Engine 2 indicated a vibration warning. Air traffic reported flames from No 2 engine. This was shutdown and the aircraft returned. Engine 2 was changed as it was severely damaged.</p> | | | | | | |
| 12.9.82 | B707 | G-BFEO | Tradewinds | Khartoum, Sudan | - | Nil |
| <p>At 400ft on take-off the aircraft struck a large stork (Ciconiidae up to 3 kg). The left-hand windscreen was obscured by blood. The aircraft returned where it was found the radome had been severely holed, with large radial crack. The ILS glideslope aerial was broken.</p> | | | | | | |
| 13.9.82 | B747CF | - | - | Luxemburg | - | Nil |
| <p>During the take-off engine 4 ingested birds resulting in fan and nose cowling damage after it had been pierced by part of a fan blade. The aircraft returned.</p> | | | | | | |
| 3.11.82 | DC10 | - | - | Entebbe, Uganda | - | Nil |
| <p>During the climb the aircraft encountered between 11 and 100 herons (Ardea sp, up to 1.8 kg), which were ingested in engines 1 and 3. Engine 1 was shutdown.</p> | | | | | | |
| 4.12.82 | B747(CF6-50) | PH-BON | KLM | Amsterdam,
Netherlands | 132 | Nil |
| <p>During the take-off run at 14.00 hrs GMT on runway 19L at about 1/3 of the runway at 135 kts the aircraft struck a flock of 100 Lapwings (Venellus vanellus, weight 250 gm) suffering multiple engine damage. The take-off was abandoned stopping with 800 metres left. The passengers disembarked via stairs at the end of the runway. Engine 1 beyond economic repair and changed, engine 2 had nine fan blades and some fan exit vanes changed, engine 3 had little damage and engine 4 had one fan blade changed. Wing trailing edge flaps also damaged. About 75 dead birds were found on the runway. Bird patrols were in continuous use.</p> | | | | | | |
| 6.12.82 | Lear 35 | HB-VFO | Private | Paris LBG | - | 1 Serious |
| <p>At about 8.30 local the aircraft abandoned take-off after V₁ as a result of striking a flock of black headed gulls (Larus ridibundus). The aircraft failed to stop and over-ran striking the ILS installation, seriously injuring the co-pilot. The aircraft was destroyed. The engines were not in fact damaged and there was one birdstrike on the wing.</p> | | | | | | |



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|---|------|--------|-----------|----------------|---|-----|
| 12.12.82 | B737 | G-AVRN | Britannia | Manchester, UK | - | Nil |
| <p>During the take-off at about 140 kts the aircraft struck a flock of lapwings, which were ingested in both engines. The aircraft returned. Engine 1 was changed, there was no damage to engine 2.</p> | | | | | | |

23.1.83 DHC-7 LX-AHA Arika Dov Airport - Nil
Tel Aviv

During a night take-off the aircraft struck flock of gulls, which rose off the runway at rotation (85kts). Vision completely lost through left windscreen and partially lost through the right. No power was lost. After climbing to 1500ft, gear and flaps left down, the aircraft returned. Over 60 strikes were counted on the aircraft and 500 to 1000 dead birds were found. The prop spinner was damaged beyond repair, two others damaged. No 2 de-icer boot damaged. Bird remains found in all engine intakes, but no engines were damaged. Wing de-icer boots damaged. One VOR & one ADF aerial damaged. Birds ingested in air conditioning system. Nose gear taxi light smashed. One over-centre spring cable on main gear was knocked off it's pulley. Crew praised aircraft's ability to cope with such a large flock with so little degradation of performance.

24.3.83 DC10 (CF6-50) LN-RKA SAS Copenhagen, Denmark 160 7 Minor

During the take-off run a flock of gulls was struck as the aircraft rotated at 165 kts. An immediate return was made because of vibration and severe damage to engine 3. Overweight landing by 44 tons, necessitated 10 wheels changed. Emergency evacuation caused minor injuries to seven people. Engine 3 fan, nose cowl and pylon internal structure damaged. On bird passed through engine 1 fan. Runway was wet, fuel jettison and reverse thrust not used due to fire risk as ATC reported engine on fire.

- .6.83 A300B F- Air France Bordeaux, France - Nil

At rotation speed on take-off the aircraft passed through a flock of birds, which were ingested in both engines. Take-off was abandoned at a speed almost equal to V2. The aircraft was successfully stopped on the runway. Both engines were changed. At least one bird had entered each engine.

17.7.83 B737 G-BHVG Orion Bristol, Lulsgate, UK - Nil

At 50ft and 130 kts during approach struck flock of pigeons and gulls. Teleflex cable from landing gear was damaged resulting in loss of ground/air sensor and associated systems.

2.10.83 B747 JT9D-7Q - China Airlines Anchorage, Alaska - Nil

During a down take-off ducks (Anas sp, weight up to 1.5 kg) were ingested in engines 1 and 2. The take-off was abandoned at 80 kts. Two fan blades on engine 2 exited the front engine cowl causing damage to the wing leading edge devices. Engine 1 overtemperated during reverse thrust due to core damage, but no fan damage. Birds were flying low across the runway, probably on migration.

8.10.83 TU134 - Aeroflot Krasnodar, USSR - Nil

Struck flock of crows (Corvus sp weight up to 550g) on take-off, right-hand engine failed and fuel pump k.ocked off. Climb rate reduced to 200 ft/min and aircraft made immediate return.

9.10.83 B707 CS-TBA Air Portugal Birmingham, UK - Nil

Take-off was abandoned at 100 kts because of multiple bird strikes and small loss of power on engine 2. No damage found but birds struck engines 1, 2, 3.

31.10.83 DC10 00- - Ostend, Belgium - Nil

During training touch and go large flock of birds were seen on the runway after take-off power had been selected. Aircraft returned to Brussels. Inspection revealed damage to engine fan with one blade separated, cowling holed and cabin window damaged. Engine 3 had signs of ingestion but no damage.

3.11.83 B737 G-BGYK Britannia Glasgow, UK - Nil

At 50ft, 133 kts during landing round-out large flock of lapwings rose from the runway. Both engines, the wing, fuselage and landing gear were struck. Engine 2 was changed due to blade damage.

4.12.83 B747 (JT9D) G-AMNE BA Muscat, Oman 327 Nil

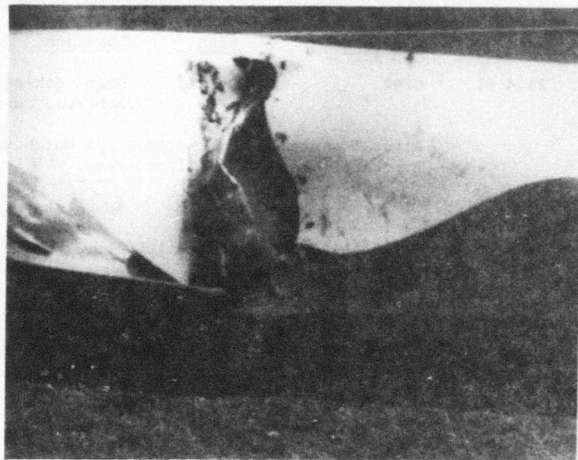
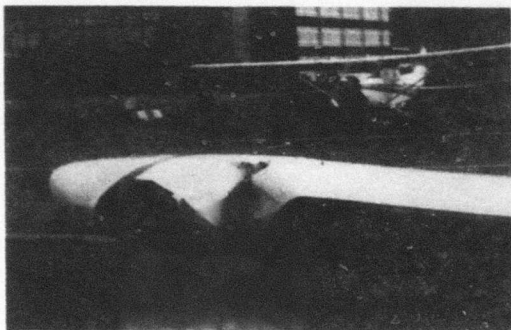
At about 150 kts on the take-off run a small thump was felt and engine 2 N1 rpm started to fluctuate, with vibration felt and indicated. The engine was shutdown. After fuel was jettisoned the aircraft diverted to a convenient maintenance facility. Engine 2 fan blades damaged, nose cowl torn and accoustic lining holed. Engine changed.

Serious Incidents to Aeroplanes of 5700kg and Below

<u>Date</u>	<u>Aircraft</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>	<u>Damage</u>
25.4.81	C182	C-FTKQ	Near Cooking Lake Alberta, Canada	-	Minor	Substantial
	Aircraft struck a duck (Anas sp) which jammed in carburettor intake causing loss of power. Aircraft forced landed into trees.					
18.7.81	C152	G-BIOM	Near Lerwick, UK	1	Minor	-
	While descending through 1000 ft at about 90 kts the aircraft struck a gull breaking the windscreen. The pilot suffered a cut nose.					
6.8.81	Cessna 402	5Y-ATU	Near Musiars, Kenya	1	1 killed	Destroyed
	Suffered birdstrike with a Ruppell's Griffon (Gyps rueppellii weight 7.5 kg) which penetrated the windscreen killing the pilot instantly. The pilot, the sole occupant was killed and the aircraft destroyed.					
-1.82	Microlight	G-	Nr Bolton, England	-	Nil	-
	A flock of gulls were encountered and the engine exhaust was knocked off (falling near a house and going 3" deep into the frozen ground). The pilot glided to a safe landing.					
2.2.82	Beech 200	EI-	Nr Nairobi, Kenya	-	-	Substantial
	While on final approach the pilot attempted to avoid a large flock of birds, but shortly afterwards the pilot felt a large thump at the back end of the aircraft and it pitched up. After recovering a normal landing was made. The bird, a Marabou Stork (Leptoptilos Crumeniferus weight up to 7 kg) struck the fin leading edge, crushing the whole fin leading edge back to the front spar. The fin attachment was not damaged.					
10.2.82	C404		Maya Maya, Congo	-	1 minor	-
	During approach the aircraft struck bats (Chiroptera) smashing the windscreen and slightly injuring the pilots face.					
3.4.82	Cessna 172	F-	Sarre Union, France	-	Nil	-
	Just before touchdown the pilot noticed two buzzards (Buteo sp) on the beginning of the runway so the pilot overshoot and made a circuit. On his second approach both birds were in the air and the pilot took evasive action to miss one of them. The aircraft landed too fast, bounced and the landing gear and propeller were damaged. The bird damaged the left-hand wing leading edge.					

30.7.82 Piper PA23 G-AYWF Amsterdam, Netherlands Nil -

While making a night landing a thump was felt as the aircraft descended through 150ft. A Grey heron (Ardea cinerea, weight 1.8kg) had damaged struck the wing leading edge damaging ribs, stringers and holing the skin.



26.7.82 Piper PA23 VH- En route Australia - Minor -

An eagle penetrated the windshield, causing a deep cut to the pilots head and cuts to his hand. The aircraft was landed satisfactorily.

9.9.82 Wasmer Guepard F-BXCA Limoge, France 1 1 Serious -

While descending through 1800ft at 140kts the aircraft struck an Osprey (Pandion haliaetus - weight 1.5 kg). The windscreen was shattered and the pilot's head and face badly cut.



31.10.82 Piper PA24 - Bensbach, Papua New Guinea - Nil -

The right-hand windshield was broken by a cockatoo (weight up to 900gm).

16.1.83 Cessna 152 G-BFKG Middle Wallop, UK 1 Nil Substantial

Loud bang at lift-off as the aircraft struck a bird. The pilot decided to re-land during which the nose wheel collapsed. Dead bird, probably lapwing found on the grass runway.

6.5.83 Piper PA23 G-ASMN White Waltham, UK - Nil -
Aztec

Just after lift-off the aircraft struck a pigeon. The wing leading edge was badly damaged and full rudder was required during landing.

24.5.83 Partenavia P68 SY-BDC Keekorok, Kenya - Nil -

During climbing turn at 400ft after take-off a Bataleur Eagle (Terathopius - weight 2.3 kg) struck the left-hand stabilator. There was severe leading edge damage but no adverse control effects.

Serious Incidents to Helicopters

<u>Date</u>	<u>Aircraft</u>	<u>Regn</u>	<u>Location</u>	<u>Total Aboard</u>	<u>Injury</u>	<u>Damage</u>
2.3.81	Bell 206	CF-	Vancouver State Canada	4	Four Killed	Destroyed

The helicopter went missing on a low altitude sheep count and was not found till Jun 8. When found at least one raven (*Corvus corax*, weight 1.2 kg) had struck the plexiglass front windscreen and probably entered the cockpit area. The helicopter crashed as a result, killing all 4 on board.

3.6.81	Bell 47	G-	Redhill, UK	-	-	Minor
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While in the hover the rotor was damaged when a crow (*Corvus sp* weight 550 gm) flew into it.

2.1.82	Bell 206	G-BAUM	3 miles from Kelso Scotland	-	-	Minor
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While cruising at 600 ft at 90 kts the pilot felt a slight yaw and simultaneous severe vibration. He shut down the engine and made an autorotative landing in a field. The tail rotor had been struck by a bird (leaving three small feathers) bending the leading edge of a blade out of alignment, and resulting in tail rotor drive shaft damage.

24.2.82	SA341 Gazelle	F-GAMK	Marseilles, France	-	Minor	-
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While flying at 200 ft and 100 kts the aircraft struck a gull smashing the window in the door causing minor injury to the passengers.

13.4.82	SA 341 Gazelle	G-	New Seaton, UK	-	-	Minor
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At 1800 ft, 125 kts a gull was seen to pass over the rotor, no impact was heard or felt. On landing the stabilizer "fibreglass" fin skin was found to be cracked and had to be renewed.

15.7.82	AS 332 Tiger	G-TIGG	Nr Montelimar, France	-	Nil	Minor
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While en-route at 145 kts, 2000 ft the aircraft struck an eagle, holing the radome and jamming the radar scanner.

16.7.82	SA319 Allouette	F-	France	-	Minor	-
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While flying at 1500ft and 200 kts a martin (*Riparia* weight 14 gm) penetrated the windshield injuring the pilot.

21.7.82	SA318 Allouette	F-	Lyon Satolas, France	-	Nil	-
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While approaching to land at 500 ft and 6 kts the windshield was penetrated by a starling (*sturnus vulgaris* weight 80 gm).

-.-.82	Bell 206	N-	Detroit, U.S.A.	-	Minor	-
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A Mallard Duck weighing 5lbs broke the windscreen knocking the pilot unconscious and breaking his nose. The helicopter was on autopilot (fitted at pilot's request) and the pilot came to at 700 ft and 110 kts over Detroit.

1.9.83	SA316 Alouette	F-BYCS	Montpellier, France	-	1 Minor	-
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Approaching the aircraft at 150 ft and 85 kts the helicopter collided with a gull weighing 1.2 kg and 4 ft wingspan. The windscreen was shattered, the remains striking the pilot, who retained control and landed safely, in spite of cuts on his hands.

-.11.83	Bell 206	-	Sandakan, Borneo	-	Nil	Minor
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Large bird of prey attached the helicopter, the pilot managed to do away the birds first attempt but when the pilot looked up the eagle was again diving with wings folded. At the last second the bird must have realised there was something odd about its "prey", as it spread its wings and attempted to torn away. The wing smashed the nose bubble and the body holed the honeycombe belly structure. Bird was Brahming Kite (*Haliastur indus*, weight 1500 gm)

BIRDSTRIKES 1912 to 1980Fatal Accidents and Destroyed Aircraft over 5700kg (12500lb) together with Executive Jets

<u>Date</u>	<u>Aircraft</u>	<u>Location</u>	<u>Occupants</u>	<u>Deaths</u>	<u>Other</u>
4.10.60	L188 Electra	Boston, USA	72	62	9 serious injuries
	Starling (<i>Sternus vulgaris</i> weight 85 gm) flock ingested into 3 engines, aircraft stalled and crashed.				
15.7.62	DC3	Lahore, W Pakistan	2	1	-
	Co pilot killed when vulture (<i>Falconiformes</i>) penetrated windscreen during cruise.				
23.1.62	Viscount	Maryland, USA	17	17	-
	At 6000ft whistling swan (<i>Cygnus columbianus</i> weight 8 kg) struck and removed left tailplane, aircraft crashed.				
28.7.68	Jet Falcon	Lake Erie, USA	3	Nil	Aircraft ditched
	Gulls (<i>Larus spp</i>) ingested into both engines on take-off causing severe damage, ditched in lake.				
23.7.69	DC3	Nr Djibouti, E Africa	4	Nil	Aircraft destroyed
	Cranes (<i>Grus sp</i> weight up to 5 kg) blocked carb intakes on both engines, ditched in sea.				
26.3.73	Lear 24	Atlanta, USA	7	7	1 third party serious injury
	Cowbirds (<i>Molothrus ater</i> weight 45 gm) caused damage on take-off and severe power loss on both engines. Aircraft crashed into buildings.				
12.12.73	Falcon 20	Norwich, UK	9	Nil	
	Gulls* caused severe damage to both engines on take-off, crash landed.				
14.6.75	NA265 Sabreliner	Watertown, USA	6	Nil	3 serious injuries
	Franklin's gulls (<i>Larus pipixcan</i> weight 260 gm) ingested in both engines on take-off, crash landed.				
12.11.75	DC10	Kennedy NY, USA	139	Nil	2 serious injuries
	Gulls ⁺ ingested in Eng 3 which exploded, causing severe wing fire, abandoned take-off, aircraft burnt out.				
20.11.75	HS125	Dunsfold, UK	8	-	6 third party deaths
	Lapwings (<i>Vannellus vanellus</i> weight 300 gm) ingested in both engines on take-off, power loss, crash landed destroying car.				
6.2.76	Lear 24	Bari, Italy	2	Nil	Aircraft Destroyed
	Gulls ingested in both engines, power lost and crashed in field.				
12.11.76	Falcon 20	Naples, Florida USA	11	Nil	11 serious injuries
	Ring-billed gulls (<i>Larus delawarensis</i> weight 485 gm) caused both engines to fail just after lift-off, causing aircraft to crash.				
4.4.78	Boeing 737	Gosselies, Belgium	3	Nil	Aircraft Destroyed
	Wood pigeon (<i>Columba palumbus</i> weight 450 gm) ingested during touch and go, abandoned take-off and over-ran. Burnt out.				
25.7.78	Convair 580	Kalamazoo, USA	43	Nil	3 serious injuries
	Sparrow hawk (<i>Falco sparverius</i> weight 120 gm) ingested in one engine on take-off, auto feathered, crashed in field.				

* Common (*Larus canus* weight 400 gm) and Black-headed (*Larus ridibundus* weight 300 gm)

+ Great black-backed (*Larus marinus* weight 1.8 kg) Ring-billed (*Larus delawarensis* weight 585 gm) and Herring (*Larus argentatus* weight 1.1 kg)

Fatal Accidents to Aeroplanes of 5700 kg and Below

<u>Date</u>	<u>Aircraft</u>	<u>Location</u>	<u>Occupants</u>	<u>Deaths</u>	<u>Damage</u>
3.4.12	Wright Flyer	Long Beach, Calif USA	1	1	Destroyed
	Struck gull while flying along the beach. Controls jammed and aircraft crashed drowning pilot.				
10.2.29	Arado	Madras, India	2	2	Destroyed
	Shortly after take-off struck large bird, aircraft crashed.				
--.55	Cessna	Aberdare Mtns, Kenya	1	1	Destroyed
	En-route struck vulture, pilot attempted to avoid but bird hit wing tip jamming ailerons.				
10.1.59	-	Serengeti, Tanganyika	1	1	Destroyed
	Struck a Griffon vulture (Gyps fulvus, 5.4 kg) and crashed.				
--.3.63	Beech 35	Bakersfield, Calif USA	1	1	Destroyed
	Common loon (Gavia immer wt 3.7 kg) which removed right hand tailplane.				
1.2.64	Turbulent	Nr Belfast UK	1	1	Destroyed
	Spun in from low altitude after striking or avoiding gull. Dead gull found 60 yards away and avian blood on windscreen of open single seater aircraft.				
2.7.71	Cessna 180	British Columbia, Canada	3	2	Destroyed
	En-route struck a Bald eagle (Haliaeetus leucocephalus wt 5 kg).				
16.4.72	Mitsubishi MU2	Atlantic City, USA	3	3	Destroyed
	While in climb struck flock of geese, windshield destroyed incapacitating one or both pilots. Uncontrolled descent into the sea.				
30.8.76	Saab MFJ15	Nr Awassa, Ethiopia	2	2	Destroyed
	Climbing through 200 ft struck Vulture. Aircraft went out of control and crashed vertically.				
23.4.77	Aero Commander 690	Chicago, USA	4	4	Destroyed
	Gull ingested in one engine, emergency procedures improperly executed and aircraft spun into the water.				
19.10.79	Swearingen Merlin	Palo Alto, Calif USA	-	2 killed 1 serious	Destroyed
	During approach a flock of birds clogged an engine intake (engine not damaged). Pilot attempted overshoot but lost control crashing inverted into parking area destroying or damaging 7 other aircraft.				

Fatal Accidents to Helicopters

Nil

