

AAIB Bulletin No: 3/95

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Aircraft Type and Registration: Reims Cessna F406 Caravan II, G-SFPA
No & Type of Engines: 2 Pratt & Whitney PT6A-112 turboprop engines
Year of Manufacture: 1991
Date & Time (UTC): 18 November 1994 at 1635 hrs
Location: Inverness Airport
Type of Flight: Fisheries Surveillance
Persons on Board: Crew - 3 Passengers - None
Injuries: Crew - None Passengers - N/A
Nature of Damage: Grazed windscreen, impact damage to leading edge of tailplane; dented engine exhaust stub
Commander's Licence: Commercial Pilot's Licence
Commander's Age: 40 years
Commander's Flying Experience: 2,723 hours (of which 1,947 were on type)
Last 90 days - 214 hours
Last 28 days - 59 hours
Information Source: AAIB Field Investigation

The Birdstrike

It was officially dark at the time of the accident (sunset had occurred 45 minutes earlier at 1550 hrs) and the weather was fine with broken cloud through which the full moon could be seen. One aircraft had taken off at 1601 hrs from Runway 24 and the previous landing had occurred at 1618 hrs. There were no aircraft in the visual circuit but there was an inbound Shorts 360 to the west of the airport carrying out the early stages of an instrument approach.

The Cessna Caravan carried out a visual straight-in approach to Runway 24 at a speed of 120 kt with the commander handling and all the landing lights switched on. At about 100 to 150 feet agl, it flew through a large flock of geese. The geese were not seen until they were some 30 feet in front of the aircraft and the commander decided not to take avoiding action because of the low altitude. During the ensuing strikes by at least four geese, both pilots shielded their faces but none of the birds penetrated the cockpit windows. After the geese had cleared the aircraft, the co-pilot confirmed that the engine indications were normal whilst the commander continued the approach and executed a safe landing.

During the late stages of the approach the commander briefly transmitted the word "BIRDSTRIKE" followed shortly afterwards by the words "EMERGENCY PLEASE" to ATC who in turn alerted the airport fire service. After landing, the commander cancelled the emergency and informed the fire crew that a flock of about 100 geese flew in front of them when they were about 200 metres from touchdown. Bird remains and blood were found on various parts of the aircraft including the left propeller, left engine nacelle, left tailplane and on the metalwork at the base of both pilots' windscreens.

Immediately after the accident the Shorts 360 was instructed to hold whilst the runway was inspected for debris. No bird remains or other debris were found and the Shorts 360 landed at 1648 hrs. A bird scaring run in the undershoot of Runway 24 was completed at 1700 hrs before the next scheduled service arrival at 1708 hrs. Later that evening, the dismembered carcasses of four geese were recovered from a field adjacent to the runway approach lights some 700 metres from the displaced threshold markings. It was not possible to determine whether these birds had been roosting in the field and frightened into flight by the approaching aircraft or whether they had been crossing the approach path. However, at that time their carcasses were found, there were no other geese roosting in the approach area.

Bird Hazard at Inverness Airport

Because of the nearby wet marshland, farmland, woodland, lakes and coastline, birds of many species are a constant hazard at Inverness Airport. The UK AIP contains a warning to this effect and states that for most of the year the hazard is moderate but it can become severe at short notice as concentrations of migratory birds move through the area. Migratory geese are a particular problem in the Moray Firth from October to February. The geese come to Scotland from the Arctic, Iceland and Greenland. The offending species are chiefly Greylag, Pink Foot, Barnacle and Brent. Although they swim easily, they spend much of their time feeding and roosting in fields. The average weight of an adult Greylag goose is 3.32 kg or 7¹/₂ lb but geese vary in size from 22 inches to 30 inches from bill to tail. They flock in hundreds and fly in large formations throughout the daylight hours. They are also active around first light and in the twilight period after sunset. Some geese habitually fly up to 25 miles from their roosts moving inland to feed on grain, potatoes and other crops as well as grass, wild shoots and roots.

When observed by the AAIB Inspector, flocks of geese feeding in fields adjacent to the airport did not appear to be alarmed by aircraft passing overhead; they carried on feeding. However, occasionally a section of the flock would depart in formation and disappear out of sight and other sections would arrive to join the remaining birds. This activity seemed to be most frequent in the early morning and late afternoon but formations of geese flying at heights of 100 to 500 feet were occasionally seen throughout the day.

Bird scaring at Inverness Airport

Bird scaring at Inverness continues throughout the year and is performed by the airport fire service. The firefighters have received training in bird scaring techniques from a commercial training organisation and they are equipped with a vehicle (Land Rover), SAPPHO (a bird scaring technique using taped recordings of birds' alarm cries), powerful searchlights and pyrotechnics. By agreement with the local landowners, the firefighters are permitted to scare birds outside the airfield perimeter beneath the approaches to the main runway. There are no hard surfaced roads in the approach areas and some of the fields are cultivated. Occasionally the off-airfield scaring is carried out on foot but this option can be limited by the waterlogged nature of the ground during the winter. Geese in these inaccessible areas have sometimes showed their reluctance to move on by ignoring shell crackers fired in their direction. Several other methods of scaring them have been tried at Inverness, all with varying and somewhat unpredictable degrees of success.

The firefighters at Inverness are also responsible for marshalling aircraft. Depending on manpower availability, on some days one firefighter on each shift is assigned to bird scaring duties and another to marshalling duties. On other days, when manpower is short (sickness, detachments etc), the secondary duties of marshalling and bird scaring are assigned to the same firefighter. Moreover the fire section must be manned by a minimum of seven persons who, in order to meet response times, cannot go off the airfield. Thus, when one man is assigned the duties of firefighting, marshalling and bird scaring, he cannot go off the airfield and he cannot be scaring birds when marshalling on the apron. Nevertheless, during the 'goose season' the fire service attempts to assign one person to full-time bird scaring every day during operating hours, but the ability to do so is governed by the willingness of firefighters to work overtime on their rest days.

On the day of the accident, the firefighter assigned to bird scaring was also the marshaller. Bird scaring runs in the Runway 24 approach area were carried out at by the first watch of the day at 0633, 0805, 0848, 0922, 1040, 1120, 1212 and 1255 hrs. The watch changed at 1400 hrs. After carrying out routine handover checks and equipment tests, a bird scaring run was carried out in the Runway 24 threshold area between 1515 and 1530 hrs after which the firefighter returned to the apron to marshal aircraft and to place obstruction lights on the apron. At about 1630 hrs he set off to carry out another bird scaring run in preparation for the arrival of a scheduled service but he was unable to continue to the 24 threshold area because the Cessna Caravan was on final approach. He was unaware of its impending arrival because it was not a scheduled movement and he had not been notified of its estimated time of arrival by ATC. The intention to land at Inverness was communicated to Inverness ATC by the flight crew of G-SFPA at 1600 hrs. They informed the controller of their plan to carry out a practice instrument approach at nearby Kinloss, go-around from that approach, and then land at Inverness at about 1615 hours.

Bird hazard alerting

The ATC log showed that by day, controllers informed pilots and the fire section of hazardous bird activity when the flocks were noticed but it was not always possible for the bird scarer to deal with birds well beyond the airport boundary. Furthermore, the approach area to Runway 24 was a mile from the Tower and in conditions of poor light or reduced visibility, controllers would have difficulty in seeing birds flying across the approach path.

Unlike some European countries, the UK does not normally promulgate the activities of migratory birds through specific notices called BIRDTAMS. These notices primarily concern the hazard generated by very large concentrations of birds that are en route and not sporadic concentrations of birds which have taken up temporary residence. In the UK, the only warnings given to civilian pilots of bird activity are in the AIP and occasionally by ATC. Of the flight guides used by pilots, only the Jeppesen plate mentioned a bird hazard. There was no mention of a bird hazard on the Aerad chart, in Pooley's Flight Guide, or on the Bottlang VFR chart. However, the Aerad, Jeppesen and Bottlang plates mentioned a deer hazard.

Statistics

There are normally about 24 scheduled movements per day at Inverness Airport, mostly by turboprop aircraft but there are six Boeing 737 schedules each weekday. There are also a number of unscheduled movements such as air ambulance flights, air taxi flights and training flights. The winter schedules tend to result in peak periods of activity; there are five movements between 0905 and 0940 hrs and seven between 1640 and 1730 hrs. During the depths of winter, these periods tend to coincide with the movement of geese to and from their overnight roosting sites.

Statistics provided by the CAA showed that since October 1991, there have been nine reported birdstikes by aircraft operating into or out of Inverness airport. Of these, six have involved Boeing 737 aircraft and at least five have been caused by herring gulls. One occurred on take-off, one on climbout and the remainder on late final approach or during the landing roll. Five of the strikes occurred at night. The accident to G-SFPA was the first birdstrike involving geese but the aircraft's second strike at Inverness; it had previously struck a bird on climbout during August 1993.

Bird control guidance

The Civil Aviation Authority produces CAP 384, a guide to bird control on aerodromes. The document recognises that *'The effort devoted to bird control obviously has to be related to the resources which can reasonably be provided at individual aerodromes.'* The techniques used at Inverness were generally in accordance with the guidance provided in CAP 384, albeit that this

document made no mention of wild geese. In its Aerodrome Licensing Manual, the CAA also states: *'A careful assessment of the hazard must be made at each aerodrome and should from time to time be reviewed. Re-assessment is essential when there is a noticeable change in bird behaviour patterns.'* The most recent survey of the bird hazard at Inverness was conducted in November 1989. Because the number of geese in the Inverness area appears to have increased markedly since then, the AAIB has recommended to the Airport Authority that the local hazard and the methods of dealing with it should be re-assessed by independent experts. [Safety Recommendation 95-6]