Havarikommissionen
Accident Investigation Board Denmark

BULLETIN

Accident

22-1-2014

involving

OY-JAI

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FOREWORD

This bulletin reflects the opinion of the Danish Accident Investigation Board regarding the circumstances of the occurrence and its causes and consequences.

In accordance with the provisions of the Danish Air Navigation Act and pursuant to Annex 13 of the International Civil Aviation Convention, the investigation is of an exclusively technical and operational nature, and its objective is not the assignment of blame or liability.

The investigation was carried out without having necessarily used legal evidence procedures and with no other basic aim than that of preventing future accidents and serious incidents.

Consequently, any use of this bulletin for purposes other than preventing future accidents and serious incidents may lead to erroneous or misleading interpretations.

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BULLETIN

General

File number:	HCLJ510-2014-257
UTC date:	22-1-2014
UTC time:	07:50
Occurrence class:	Accident
Location:	Copenhagen Airport, Roskilde (EKRK)
Injury level:	None

Aircraft

Aircraft registration:	OY-JAI
Aircraft make/model:	CESSNA 500
Current flight rules:	Instrument Flight Rules (IFR)
Operation type:	General Aviation Other Ferry/positioning
Flight phase:	Take-off
Aircraft category:	Fixed wing Airplane
Last departure point:	Denmark EKRK (RKE): Copenhagen/Roskilde
Planned destination:	France LFQT (HZB): Merville Calonne
Aircraft damage:	Substantial
Engine make/model:	PRATT & WHITNEY (CANADA) JT15

Notification

All times in this report are UTC.

The Aviation Unit of the Danish Accident Investigation Board (AIB) was notified of the accident by the Area Control Center at Copenhagen Airport, Kastrup on 22-1-2014 at 08:10 hrs.

The International Civil Aviation Organization (ICAO), the European Aviation Safety Agency (EASA), the Directorate-General for Mobility and Transport (DG MOVE), the National Transportation Safety Board (NTSB USA) and the Danish Transport Authority (DTA) were notified of the accident by the Danish AIB on 22-1-2014.

FACTUAL INFORMATION

History of the flight

The accident flight was a commercial ferry flight from Copenhagen, Roskilde (EKRK) to Merville Calonne (LFQT).

After take-off from runway 11 at EKRK, the aircraft was established in climb with a nose-up pitch attitude of approximately 13-15°.

Just before reaching the flap retraction altitude of 400 feet above ground level, the flight crew noticed "something white" in front of the aircraft.

The commander, who was the pilot flying, immediately initiated an aircraft pitch increase, but almost simultaneously a "bang" was heard and a bump was felt in the aircraft, most likely coming from the underside of the aircraft.

The flight crew observed large white birds below the aircraft.

The flight crew realized that the aircraft had been hit by one or more birds, probably Mute Swans, and decided to leave the flaps at the take-off setting of 15°.

Cockpit indications did not show any abnormalities and the aircraft handling and controllability did feel normal by the flight crew.

In order to return to EKRK, the flight crew performed a visual traffic pattern and approach to runway 11, followed by a normal landing and roll-out.

The aircraft taxied to the run-up area for runway 29, where an inspection performed by the fire and rescue service personnel revealed that fuel leaked from the left wing.

The air traffic controller relayed this information to the flight crew who immediately performed an engine shut down and evacuated the aircraft.

On-site, an intermittent repair was performed and the aircraft was towed to a maintenance facility in order to carry out sufficient drainage of fuel.

The accident took place in daylight and in visual meteorological conditions (VMC).

Damage to aircraft

The aircraft had suffered several birdstrikes and was damaged on the left wing leading edge, lower forward part of the left wing and the lower right hand side of the nose radome.

In addition, there were remains of blood and tissue on the left engine inlet lip and in the aft part of the fan duct.

Meteorological information

EKRK METAR 220720Z AUTO 09016KT 9999NDV OVC023 /// M00/M05 Q1019
EKRK TAF 220540Z 2206/2215 090/15KT 9999 BKN020

According to the flight crew, the lighting conditions and the light grey coloured overcast made it difficult to visually detect birds of white or light grey colours.

Wreckage and impact information

At the maintenance facility performing the repair, the Danish AIB inspected the aircraft.

The skin and front stringers of the leading edge of the left wing was bended. Structural damage had opened the wing tank, allowing the fuel to leak.

The main spar of the wing was undamaged.

There were skin and structural damage to the nose section.

Both engine inlet lips and engines were undamaged (bore scope inspection revealed no damage).

The above picture shows the wing integral fuel tank. The front bottom stringer was removed for replacement and the skin on the lower part of the wing has been repaired.

Bird species information

Immediately after the accident, four dead Mute Swans were found close to runway 11. The injuries indicated that the birds were struck by an aircraft.

Bird species:	Mute Swan *(Cygnus olor) (In Danish: Knopsvane).*
Weight:	8 500 – 14 000 g.
Length:	150 cm.
Wing span:	205 - 235 cm.

Copyright: Erik Biering.

The Mute Swan is common in most parts of Denmark including all parts of Zealand. During the winter season, they often reside in large areas with shallow brackish waters.

Additional information

According to the Wildlife Control Unit of Copenhagen Airports Safety Department, the Mute Swan has a very shallow climb angle. This indicated that the birds involved in the accident were en-route and not residing locally.

A normal flight path for a group of Mute Swans during the winter season could be from Koege Bugt to Roskilde Fjord, Isse Fjord or Saltbaek Vig near Kalundborg.

The flight crew stated that the birds came from an easterly direction, meeting the aircraft almost head-on.

ANALYSIS

When the flight crew observed the birds at approximately 400 feet above ground level, it was too late to avoid a birdstrike.

The Danish AIB is of the opinion that the prevailing lighting conditions and the small relative movement of the birds in regard to the aircraft, made it difficult for the flight crew to spot the birds.

In addition, the aircraft nose-up pitch attitude might have prevented the flight crew from visually spot the birds approaching almost head-on.

The damage to the aircraft and the bird remains on the aircraft and the engine confirmed that the aircraft had suffered a birdstrike.

In the opinion of the Danish AIB, the decision of the flight crew to return to EKRK and initially maintain the existing aircraft configuration was an appropriate course of action.

Even though, the aircraft handling did feel normal to the flight crew and the cockpit instrument indications were normal, the aircraft was substantially damaged.

Based upon the angle of climb of the Mute Swan and the altitude of 400 feet above ground level, the Danish AIB finds it unlikely that the birds, which hit the aircraft, were residing close to EKRK.

In the opinion of the Danish AIB, it is difficult for an airport operator to mitigate the risk of birdstrikes under such conditions, as it is unrealistic to expect a complete control of or warning capability against birds residing at unspecific locations away from the airport.

CONCLUSIONS

The accident was caused by a multiple birdstrike.

Up to four Mute Swans damaged the left wing leading edge and the nose radome which resulted in bending of the skin and the stringer structure beneath.

The left wing integral fuel tank structure was damaged resulting in a fuel leak.

Three contributing factors were identified:

1. The lighting condition in combination with the colour of the birds.
2. The small relative movement between the birds and the aircraft.
3. The aircraft nose-up pitch attitude might have impaired the flight crew’s forward vision.