

SERIOUS INCIDENT

Aircraft Type and Registration:	Bell 429, M-YMCM	
No & Type of Engines:	2 Pratt & Whitney 207D turboshaft engines	
Year of Manufacture:	2012	
Date & Time (UTC):	25 November 2018 at 1518 hrs	
Location:	On approach to Edinburgh Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - 1 (Minor)
Nature of Damage:	Left windshield shattered and damage to interior trim	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	52 years	
Commander's Flying Experience:	3,900 hours (of which 800 were on type) Last 90 days - 66 hours Last 28 days - 24 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

Whilst on short final to Edinburgh Airport, at approximately 100 kt, the helicopter suffered a bird strike to the left windscreen. The windscreen shattered and debris entered the cockpit, injuring the occupant in the left seat, who required hospital treatment.

The Bell 429 windscreen is not designed to withstand bird strikes and the design certification requirements do not require it to do so. A recent study by the Rotorcraft Bird Strike Working Group has recommended the introduction of bird strike protection requirements for Normal category rotorcraft to minimise the risk of damage or injury.

History of the flight

The helicopter was flying from Blackpool to Edinburgh. It was being flown from the right seat and the left seat was occupied by a passenger, who was also a qualified Bell 429 pilot. Whilst on short final for landing, at a speed of approximately 100 kt, the pilot noticed several birds off the left side of the helicopter. These were not considered to present a threat but he then saw a single bird straight ahead, crossing from right to left. He immediately banked the helicopter to the right but was unable to avoid the bird, which struck the left windscreen. The windscreen shattered and the passenger sustained injuries to his face and hands.

The pilot declared a MAYDAY before successfully landing and the passenger was taken to hospital.

Examination of the helicopter

The left windscreen had shattered and remnants of the acrylic material were found throughout the cockpit and passenger area (Figure 1).



Figure 1

Left windscreen damage

The bird was killed in the impact and was found inside the passenger area. It was identified as a wood pigeon, weighing approximately 640g.

The helicopter manufacturer reviewed photographs of the damaged windscreen and its broken fragments. They concluded: *‘that the outcome, based on the size of bird and airspeed, is what was expected and in line with previous events’*.

Helicopter bird strike certification requirements

Normal category rotorcraft

Canadian Airworthiness Manual Chapter 527 defines the specification requirements for Normal category rotorcraft. This includes helicopters with maximum weights of 7,000 lb (3,175 kg) and up to nine passenger seats. The specification does not define any requirements relating to bird strike resistance, but there is a requirement that *‘windshields and windows must be made of material that will not break into dangerous fragments’*.

The equivalent design requirements in Europe and the United States of America are CS-27 and FAR-27, respectively. Both these specifications define the same requirements as the Canadian Airworthiness Manual.

Transport category rotorcraft

Canadian Airworthiness Manual Chapter 529 defines the specification requirements for Transport category rotorcraft. This includes helicopters with maximum weights exceeding 7,000 lb (3,175 kg) or more than nine passenger seats. The equivalent design specifications in Europe and the USA are CS-29 and FAR-29, respectively.

All three specifications define a bird strike requirement of 1 kg.

Bell 429

The Bell 429 is certified to the requirements of Canadian Airworthiness Manual Chapter 527 and has no demonstrated bird strike protection.

M-YMCM was equipped with the stretched acrylic windscreens, which the manufacturer indicates offers additional protection over standard acrylic windscreens. Stronger, Polycarbonate windscreens are available as an option.

Previous bird strike incidents

The AAIB has issued three previous reports after similar events on helicopters certified to the Normal rotorcraft category requirements: N109TK (AAIB Bulletin 3/2012), G-ODAZ (AAIB Bulletin 6/2014) and G-BZBO (AAIB Bulletin 11/2016).

Previous safety actions

In November 2010, the National Transportation Safety Board (NTSB) wrote to the Federal Aviation Administration (FAA) with Safety Recommendations following an investigation of a Sikorsky S-76C bird strike accident that resulted in eight fatalities. The S-76C is certified to FAA Part 29, which includes a 1 kg bird strike protection requirement. Acknowledging that Part 27 does not define bird strike protection requirements, the NTSB recommended that it should be amended to include such a requirement.

The FAA assigned the Aviation Rulemaking Advisory Committee (ARAC) the task of providing recommendations regarding bird strike protection rulemaking, policy, and guidance for Normal category rotorcraft, to evaluate existing bird strike protection standards for Transport category rotorcraft, and to provide recommendations for enhancement. In response, the ARAC established a Rotorcraft Bird Strike Working Group.

Rotorcraft bird strike working group

The working group included representatives from aviation regulators and several helicopter manufacturers, including Bell. The group issued a final report in November 2017, which is available from the FAA website¹.

Footnote

¹ Rotorcraft Bird Strike Working Group Recommendations to the Aviation Rulemaking Advisory Committee (ARAC), dated 10 November 2017. [Accessed 28 February 2019] https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/ARAC%20RBSWG%20Final%20Report.pdf [Accessed 28 February 2019]

The working group made several recommendations relating to policy and guidance, both for helicopters already in service and for those requiring new certification.

For newly certificated Normal category rotorcraft, the working group recommended the introduction of a 1 kg bird strike protection requirement. For Normal category rotorcraft already in service, and for newly manufactured aircraft, the working group encouraged operators to implement bird strike safety procedures. These include:

Reduce airspeed when practical. Training should remind flight crews that more than 3 out of 4 bird strikes (77%) occur during airspeeds greater than 80 knots. No bird strikes have been reported in the NWSD below 55 knots. Therefore, if flight operations allow slower airspeeds in areas known to have a high-density bird population, reduce the airspeed to 80 knots or less, particularly at lower altitudes.

Increase altitude as soon as possible and practical, when allowed by other flight variables. Rotorcraft operators should be reminded that there is a 32% decrease of bird strike likelihood with every 1,000 ft gained above 500 ft AGL and that 93% of all strikes occur below 3,500 ft AGL. Fly higher at night when possible, since birds also fly higher at night.

Utilize personal protective equipment (PPE) consisting of a helmet and visor, at least for the crew, when practical.

Use taxi and / or landing lights in a continuous mode during sunny conditions and at night when practical, and a 2-Hz pulsed mode during partly cloudy conditions, and/or install lighting systems that provide the equivalent.'

Safety actions

European Union Aviation Safety Agency (EASA)

In November 2018, the EASA published the European Plan for Aviation Safety (EPAS) for 2019 – 2023². Rule Making Task 0726 is entitled 'Rotorcraft occupant safety in event of a bird strike'. The document states:

'Since the 1980s there have been an increasing number of accidents involving rotorcraft bird strikes where the rotorcraft was not certified in accordance with the latest bird strike protection provisions. This has resulted in a number of occurrences where rotorcraft bird impacts have had an adverse effect on safety. The objective of this RMT is to improve rotorcraft occupant safety in the event of a bird strike. This will be achieved by considering the development of new CS-27 provisions for bird strike and also considering proportionate retrospective application of applicable CS-27 and CS-29 to existing fleets and types that are not compliant with the latest provisions.'

The document indicates that associated timescales are 2024.

Footnote

² European Plan for Aviation Safety 2019 – 2023 <https://www.easa.europa.eu/document-library/general-publications/european-plan-aviation-safety-2019-2023> [Accessed 28 February 2019]

Federal Aviation Administration

In a presentation at the 12th rotorcraft symposium³, the FAA indicated that their Rotorcraft Standards Branch (RSB) is reviewing the Bird Strike Working Group report. Further FAA study and evaluation will influence potential rulemaking and indications are that the RSB will pursue rulemaking in fiscal year 2020. This will be a multi-year process to achieve a final rule and they will '*coordinate and harmonize to maximum extent with EASA*'.

The FAA indicated that they consider pilots and operators to be the first line of defence. They will consider how to address appropriate rotorcraft flight manual procedures. These are not considered to be flight limitations but '*best practices*'. They will continue discussion and studies with industry. Guidance material such as Advisory Circulars will be issued where appropriate.

Footnote

³ Presentation number 28 Bird Strike Rotorcraft Protection <https://www.easa.europa.eu/newsroom-and-events/events/12th-rotorcraft-symposium#group-easa-downloads> [Accessed 28 February 2019]