Air Accident Investigation Unit Ireland

FACTUAL REPORT

ACCIDENT

Robinson R44 Raven I, G-OAJC

Kinnitty, Co. Offaly

1 August 2014

An Roinn Iompair Turasóireachta agus Spóirt

Department of Transport, Tourism and Sport

Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable causes.

In accordance with the provisions of Annex 13[1] to the Convention on International Civil Aviation, Regulation (EU) No 996/2010[2] and Statutory Instrument No. 460 of 2009[3], safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

Accordingly, it is inappropriate that AAIU Reports should be used to assign fault or blame or determine liability, since neither the safety investigation nor the reporting process has been undertaken for that purpose.

Extracts from this Report may be published providing that the source is acknowledged, the material is accurately reproduced and that it is not used in a derogatory or misleading context.

[1] **Annex 13**: International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.
[2] **Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.
[3] **Statutory Instrument (SI) No. 460 of 2009**: Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.

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In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents on 1 August 2014, appointed Mr Paul Farrell as the Investigator-in-Charge to carry out an Investigation into this accident and prepare a Report.

Aircraft Type and Registration:	**Robinson R44 Raven I, G-OAJC**	
No. and Type of Engines:	**1 x Lycoming O-540-F1B5**	
Aircraft Serial Number:	**1381**	
Year of Manufacture:	**2004**	
Date and Time (UTC)[4]:	**1 August 2014 @ 14.40 hrs**	
Location:	**Kinnitty, Co. Offaly, N53º 05.9', W7º 42.9'**	
Type of Operation:	**Private**	
Persons on Board:	**Crew - 1**	**Passengers - 0**
Injuries:	**Crew - 0**	**Passengers - 0**
Nature of Damage:	**Destroyed**	
Commander's Licence:	**Private Pilot Licence (Helicopters) issued by the Irish Aviation Authority (IAA)**	
Commander's Details:	**Male, aged 62 years**	
Commander's Flying Experience:	**620 hours, of which 472 were on type**	
Notification Source:	**An Garda Síochána**	
Information Source:	**AAIU Report Form submitted by Pilot** **AAIU Field Investigation**	

[4] **UTC**: Co-ordinated Universal Time. All timings in this report are quoted in UTC; to obtain the local time add one hour.

SYNOPSIS

On approach to land in an agricultural field, the helicopter's main rotor blades contacted overhead telephone wires. The main rotor blades dis-integrated and the helicopter spun and tumbled into the field. The Pilot was uninjured and evacuated the helicopter through the right, rear/passenger door. The helicopter was destroyed. There was no fire.

NOTIFICATION

The AAIU was initially notified by An Garda Síochána. Shortly thereafter the AAIU received a telephone call from the Pilot. Two Inspectors of Air Accidents attended the scene.

1. FACTUAL INFORMATION

1.1 History of the Flight / Occurrence

The helicopter departed from its hangar-base at Roscrea, Co. Tipperary on a flight to Kinnity, Co. Offaly. The intention was to land in an agricultural field on the edge of Kinnity village. The Pilot had not landed at the field before. Permission for the use of the field had been obtained from the land owner by a third party. The third party had also indicated that a person would be present in the field to indicate an appropriate landing area.

The Pilot described the field as "*a relatively square green field of approximately eight acres with some tall grass in parts and in the main quite flat*". The Pilot stated that he circled the area in a clockwise fashion and he noted that no person was present in the field to indicate an appropriate landing area. The helicopter approached the field from the northeast on a heading of approximately 225° magnetic. The Pilot told the Investigation that as he approached he could see that the grass and terrain at his initial intended landing point were not as suitable as those closer to the corner of the field. He was particularly concerned to avoid landing on long grass due to the possibility of the hot exhaust causing a fire. Consequently, the Pilot slowly 'hover-taxied' the helicopter towards the corner of the field and a better landing site.

The Pilot said that when the helicopter was at a height of approximately eight feet, his main rotor blades struck telephone wires which were running from a pole in the hedge row boundary (between the field and the road) to the school house which was located adjacent to the landing field. He stated that a Jeep on the road caught his eye and that he did not see the telephone wires. The helicopter immediately spun and tumbled, impacting the ground and coming to rest on a heading of approximately 035° magnetic, **Photo No. 1**

The Pilot, who was restrained by a lap and diagonal seat harness, was uninjured. He released himself from the seat and, due to the height of the front of the cockpit above the ground, he made good his escape through the right hand side rear/passenger door. There was no fire.

The Pilot informed the Investigation that there were no technical or control difficulties with the helicopter prior to the accident. He was unaware of the presence of the wires (**Photo No. 2**), and informed the Investigation that he did not see the pole in the hedge row boundary or the wires prior to the blades striking them. The Pilot said that weather conditions were not a factor with daylight Visual Meteorological Conditions (VMC) prevailing at all times during the flight.

Photo No. 1: The Helicopter as it came to rest.

Photo No. 2: The wire ends as found following the accident.

1.2 Witness

A witness located on the road saw the accident take place. The witness described seeing the helicopter hover-taxiing slowly towards the gate area of the field. He said that just before the helicopter blades struck the wires, he saw the wires move up and down which he speculated was due to the rotor airflow. Once the blades struck the wires the witness described large sections of blade separating and travelling more than 60 metres (m) into the field on the opposite side of the road. Thereafter the helicopter spun and tumbled quickly, coming to rest in the field.

1.3 Nature of the flight

The Pilot informed the Investigation that the flight was a private flight. The next leg was to have involved flying two persons to Roscrea. The Pilot was asked to carry out the flight by a friend (the third party who organised landing permission). The pilot said that he was not receiving any payment for the flight.

1.4 Wire Strikes

The AAIU has investigated several wire strike events in recent years. In AAIU Final Report 2013-004 useful background information was provided, and it is timely and opportune to re-state it here:

> *Impact with overhead wires have been a regular feature of AAIU Investigations in the last number of years. There were six such events during 2009 and 2010 and a further two in 2012. The IAA launched a wire strike awareness campaign during 2010 following a Safety Recommendation from the AAIU [5] […]*
>
> *It has been noted in various AAIU / NTSB[6] / FAA[7] Reports that most helicopter wire strikes occur during daytime with good visibility and with experienced pilots in charge.*
>
> *Wires are difficult to see, partly because of the way the human eye functions and partly because of the effects of background camouflaging. In this accident, the background to the transverse wires consisted of agricultural fields bordered by trees in the foreground, with rising hills as a backdrop during the final approach.*
>
> *The movement of wires in sunlight and changing sunlight patterns can also obscure wires. Whether a pilot sees a wire or not, is the product of a complex relationship between wire visibility, human limitations, topography and situational awareness. Visibility of suspended wires is notoriously variable.*

[5] IAA Safety Leaflet IGA 6 was issued to address Wire Strike Hazards. A copy of this leaflet is available on https://www.iaa.ie/index.jsp?p=102&n=165
[6] NTSB: The National Transportation Safety Board (United States of America)
[7] FAA: The Federal Aviation Administration (United States of America)

The same wire that clearly stands out against a bright homogeneous background (such as the daytime sky) may be virtually invisible when viewed against a darker and more heterogeneous background (such as a forest or bog land). In the dynamic realm of low-level flight, even small changes in helicopter position or attitude can precipitate such a background shift.

Thus, for any given wire strike, the wire may be virtually undetectable right up to the point of contact, or it may be shifting from visible to invisible rapidly and unpredictably.

The human eye has physical limitations in its performance. One such limitation is its power of resolution - that is, the minimal size of an object that can be registered - due to the construction of the sensor (retina). In some respects the retina resembles the grain in black and white photographic film. The grain in the eye is determined by the finite size of the sense organs, the cones. The size of grain limits the detail that can be obtained. The periphery of the retina is coarse grained and picks up movement but not detail. The central part is fine grained and registers detail. Under specific conditions, i.e. against a plain contrasting background such as the sky, the eye has a compensating mechanism that relies on this contrast. In effect, we perceive the break in continuity of the background rather than 'seeing' the wire itself. The brain translates this into seeing. However, if contrast is reduced and the plain background is broken up, then the basic visual mechanism becomes limited by the grain (cone) size. The wire literally disappears as it is simply beyond the limits of the eye to see it.

These physiological facts have obvious and important implications for pilots. As such, pilots need to use a variety of skills/options to assess the presence of wires. This can be done by viewing local maps, carrying out a local ground inspection, looking for poles or pylons where the likelihood is that wires would be attached. Finally, and prior to commencing descent for an approach/landing, the assessment can be done by carrying out an aerial reconnaissance at an adequate safety height and airspeed above the intended operating or landing site.

2. AAIU COMMENT

The accident was due to contact between the helicopter's main rotor blades and the telephone wires. The Pilot was not familiar with the landing site. The fact that no person was present in the field to indicate an appropriate landing area deprived the Pilot of a resource which may have resulted in him being aware of the wires. The difficulties of seeing wires and the dangers of striking them are well known and have been well documented in previous AAIU reports.

3. CONCLUSIONS

(a) Findings

1. The helicopter was on a Private flight.
2. The flight was made in daylight and VMC conditions prevailed.
3. The Pilot had not landed at the site before.
4. When the helicopter made its approach, no person was present in the field to indicate an appropriate landing area.
5. The helicopter's main rotor blades struck telephone wires causing the helicopter to spin and tumble quickly before coming to rest in the field.
6. There were no injuries.
7. The Pilot exited the helicopter through the right, rear/passenger door.
8. The helicopter was destroyed.

(b) Probable Cause

1. The helicopter's main rotor blades struck telephone wires leading to a loss of control.

(c) Contributory Cause(s)

1. Lack of familiarity with the landing site.
2. No person was present in the field to indicate an appropriate landing area.

- END -

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No. 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

AAIU Reports are available on the Unit website at www.aaiu.ie

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