



Air Accident Investigation Unit Ireland

PRELIMINARY REPORT

ACCIDENT

**Robinson R44 Raven II, N999RL
Kennycourt, Co. Kildare, Ireland**

11 December 2022



An Roinn Iompair
Department of Transport

PRELIMINARY REPORT

Foreword

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

In accordance with the provisions of Annex 13¹ to the Convention on International Civil Aviation, Regulation (EU) No 996/2010² and Statutory Instrument No. 460 of 2009³, 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 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.

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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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This Investigation is being conducted in accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI No. 460 of 2009. This Preliminary Report contains information known at this time and does not contain analysis or conclusions. This information is therefore subject to change and may subsequently be found to contain errors; any errors in this Report will be corrected in the Final Report.

Aircraft Manufacturer:	Robinson Helicopter Company
Model:	R44 Raven II
Registration:	N999RL
State of Registry:	United States of America
Serial Number:	10614
Year of Manufacture:	2005
Type of Operation:	Private
Date and Time (UTC)⁴:	11 December 2022 @ 15:45 hrs
Location/Position:	Agricultural field near Kennycourt, Co. Kildare, Ireland
Persons on Board:	Crew – 1 Passengers – 0
Injuries:	Crew – 1 (Fatal)
Nature of Damage:	Helicopter destroyed
Investigator-In-Charge:	John Owens

⁴ **UTC:** Co-ordinated Universal Time. All times in this report are quoted in UTC unless otherwise stated; local time was the same as UTC on the date of the accident.

PRELIMINARY REPORT

1. NOTIFICATION AND RESPONSE

The AAIU was notified of the accident by Dublin Air Traffic Control (ATC) shortly after it occurred. Two inspectors of Air Accidents deployed to the accident site to commence an Investigation. Four Inspectors of Air Accidents attended the site the following morning to continue the Investigation and recover the wreckage.

2. HISTORY OF THE FLIGHT

The Pilot of the helicopter contacted the Flight Information Service (FIS) at Shannon ATC at 14:32 hrs on the day of the accident to report that he was departing from Ballygarret, Co. Wexford, *'enroute to Rosslare and then over to Kilrush Airfield'*. At 14:58 hrs, the Pilot contacted Shannon FIS to advise that he was *'lifting out of Rosslare for Kilrush Airfield'*, which is located in Co. Kildare. At 15:26 hrs, the Pilot reported to Shannon FIS that he was *'switching now to Kilrush frequency'*.

A preliminary review of ATC radar data for the flight indicates that the helicopter approached the Kilrush area from the south-east. The radar data indicates that at 15:32 hrs, when the helicopter was approximately 0.7 nautical miles (NM) to the south-west of Kilrush Airfield and at an altitude of approximately 1,900 feet (ft), it turned right (north-east). The radar data also indicates that the helicopter continued generally north-eastwards past Kilrush and towards the Kennycourt area, which is also in Co. Kildare and located approximately 6.7 NM north-east of Kilrush Airfield.

The helicopter proceeded past Kennycourt in a north-easterly direction. When it was approximately 1.5 NM north-east of Kennycourt, at an altitude of approximately 2,400 ft, it turned around and flew in a south-westerly direction back towards the Kennycourt area. The data indicates that the helicopter flew back and forth over the Kennycourt area for several minutes before radar coverage was lost. The last recorded radar position was approximately 0.3 NM (556 m) south-east of the accident site at 15:45 hrs. The data indicates that the helicopter was at an altitude of approximately 1,600 ft at this stage.

Video footage obtained by the Investigation briefly showed the helicopter descending in a steep nose-down attitude in the final moments of the flight. A post-crash fire occurred that was subsequently extinguished by local fire services.

3. INJURIES TO PERSONS

The Pilot, who was the sole occupant of the helicopter, was fatally injured.

4. WITNESSES

The Investigation spoke to several witnesses following the accident. The witnesses were situated at a number of locations in the Kennycourt and surrounding areas. The helicopter was heard to be *'coming and going'*, *'circling'* and *'moving around'*. Some of the witnesses reported being able to see a *'flashing light'* or that the helicopter became low enough to briefly see its underside. However, others said that they could not see and could only hear it.



One witness said that they thought that the helicopter was going to land, before it climbed 'nose straight up' and into cloud. A number of witnesses reported seeing the helicopter descend steeply nose-first, prior to impact. Some witnesses described hearing the sound of the engine running until an impact was heard.

5. HELICOPTER INFORMATION

5.1 General

The four-seater helicopter was a Robinson R44 Raven II. The helicopter type is fitted with a Lycoming IO-540-AE1A5 six-cylinder reciprocating engine. This powers a counter-clockwise-rotating (viewed from above) two-bladed main rotor, with a diameter of 10.06 metres (m), and a two-bladed tail rotor, with a diameter of 1.47 m. The tail rotor, which is protected by a guard, is mounted on the left side of the tailcone. When operating at normal speed, the main rotor rotates at 408 rpm⁵.

A cyclic control stick⁶ is located between the front seats and operated via a control grip in front of the pilot. The control grip is fitted to a cross tube connected to the cyclic control stick. A collective control lever⁷ is located to the left of each front seat; a twist-grip throttle control is located on each collective lever. An rpm governor assists in controlling the engine rpm under normal conditions and can be over-ridden by the pilot using the throttle twist-grip. In normal flight, a throttle correlator opens the throttle as the collective lever is raised. A red anti-collision light, which flashes when switched on, is located on the upper surface of the helicopter's tailcone, forward of the tail rotor. Navigation lights, which illuminate steadily when switched on, are located on each side of the cabin and on the tail.

The helicopter type is 11.66 m long (from the tail rotor guard to the tip of the main rotor). Two fuel tanks, with a total capacity of 180 litres, are fitted above the engine in a separate section behind the cabin area. The specified fuel is '100 LL⁸' aviation gasoline. A Service Bulletin was issued by the Helicopter Manufacturer in December 2010 (SB-78), which was revised in February 2012 (SB-78A) and in September 2012 (SB-78B). It requires R44 helicopters with all-aluminium fuel tanks to be retrofitted with bladder-lined tanks to improve the fuel system's resistance to a post-accident fuel leak and consequent fire.

The subject helicopter, registration N999RL (**Photo No. 1**), was manufactured in 2005.

⁵ rpm: revolutions per minute.

⁶ **Cyclic control stick:** The control stick in a helicopter used to change the pitch of the rotor blades during each cycle of rotation.

⁷ **Collective control lever:** The control lever in a helicopter which increases or decreases the total lift derived from the rotor by changing the pitch angle of all the main rotor blades collectively.

⁸ **100LL:** 100 octane, low lead.

PRELIMINARY REPORT



Photo No. 1: The subject Robinson R44 helicopter (*used with permission of photographer*)

5.2 Airworthiness/Maintenance Information

The helicopter's Certificate of Airworthiness was issued by the United States (US) Federal Aviation Administration (FAA) on 28 February 2005. The last Annual Inspection was certified on 7 June 2022. The most-recent maintenance inspection was a 50-Hour check, which was certified on 10 October 2022, at a total helicopter operating time of 1,001 hours. Maintenance records indicate that SB-78A (bladder-lined fuel tank retrofit) was embodied on the helicopter on 3 November 2012.

6. WRECKAGE AND IMPACT INFORMATION

The accident site was located in an agricultural field in the Kennycourt area, approximately 6.7 NM north-east of Kilrush Airfield and approximately 1 NM south-east of Brannockstown, Co. Kildare. The elevation of the site was approximately 475 ft above mean sea level (AMSL). The helicopter was destroyed due to the impact and a post-crash fire. The accident site was compact, and all parts of the helicopter were close to the main wreckage except for a piece of a main rotor blade, which was located approximately 60 m to the south-west. A large fragment of a portable fire extinguisher was found approximately 38 m away, also to the south-west.

The wreckage was recovered from the site and transported under escort to the AAIU's wreckage examination facility, where a full examination will be carried out in due course.



7. RECORDED DATA

7.1 Introduction

The Investigation obtained recorded data relevant to the flight from several sources, as outlined below. All data will be subject to detailed analysis during the Investigation. In addition, a mobile phone and a computer tablet were found at the accident site. However, both devices were substantially damaged in the accident and the availability of data has yet to be determined.

7.2 Radio Communications

The Investigation was provided with the recordings of the radio communications between the Pilot and Shannon FIS during the accident flight. These are outlined in **Section 2**.

7.3 ATC Radar Data

The Investigation also obtained radar data for the accident flight from ATC. Preliminary examination of the data showed that the helicopter was first recorded by radar at time 15:28:48, when it was approximately 5.5 NM south-east of Kilrush Airfield, at an altitude of approximately 2,400 ft, and heading in the general direction of the airfield. The last recorded position was 0.3 NM (556 m) south-east of the accident site at time 15:45:05. The data indicates that the helicopter was at an altitude of approximately 1,600 ft at that time.

7.4 Automatic Dependent Surveillance – Broadcast (ADS-B)

Automatic Dependent Surveillance – Broadcast (ADS-B) is an aircraft surveillance technology that broadcasts an aircraft's altitude and its navigation satellite-derived position automatically and without interrogation from a ground-based system. ADS-B information was obtained for the flight. The ADS-B signal appears to have been lost in the Co. Wexford area and re-acquired to the north-east of Kilrush Airfield.

7.5 Video Recordings

Video footage obtained by the Investigation shows the final one second approximately of the flight, in which the helicopter can be seen descending in a steep nose-down attitude.

8. METEOROLOGICAL INFORMATION

Met Éireann, the Irish meteorological service, was asked to provide an aftercast of the weather conditions prevailing in the Kennycourt/Kilrush areas around the time of the accident. The details are outlined in **Table No. 1**.

PRELIMINARY REPORT

Meteorological Situation:	Ireland lies in a light to moderate north-easterly airflow between an anticyclone over Greenland and a weak depression centred near the south coast of England.
Surface Wind: Wind at 2,000 ft: Between Surface and 300 ft:	Variable 2-5 Knots (kt). North to north-east 10-15 kt. North to north-east 5 kt.
Visibility:	Generally 3-5 kilometres (km), with pockets down to 300-800 m.
Weather:	Overcast and misty with pockets of freezing fog.
Cloud:	Generally, an overcast layer (8/8th oktas ⁹) of cloud with bases between 200-500 ft (AMSL). Cloud would have been lower and thicker in the fog patches. The low cloud and fog blanket was not deep, in the order of tens to a couple of hundred feet. Largely clear skies above the layer at 2,000 ft (AMSL).
Surface Temperature/Dew Point:	0° Celsius/-1° Celsius.
Mean Sea Level (MSL) Pressure:	1010 hectopascals (hPa).
Freezing Level:	1,000 ft.
Other Comments:	Temperatures across Leinster at 15:00-16:00 hrs ranged between -1° to +2° Celsius. There were numerous observations of freezing fog through the period of cold weather around the date of the accident. The probability of freezing fog on the day was high.

Table No. 1: Meteorological aftercast for the Kennycourt/Kilrush Airfield areas

9. ONGOING INVESTIGATION

The Investigation is ongoing, and a Final Report will be published in due course.

- END -

⁹ **Oktas:** Unit of cloud amount, expressed as number of eighths of the sky dome that is covered by clouds.

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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