Air Accident Investigation Unit Ireland

FACTUAL REPORT

ACCIDENT

Aeroprakt A-22L2, EI-HNC

Cloongoonagh, Co. Mayo, Ireland

7 September 2024

An Roinn Iompair
Department of Transport

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.

AAIU Report No: 2025-002

State File No: IRL00924026

Report Format: Factual Report

Published: 2 April 2025

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, on 7 September 2024, the Chief Inspector of Air Accidents appointed John Owens as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	**Aeroprakt A-22L2, EI-HNC**
No. and Type of Engines:	**1 x Rotax 912 UL**
Aircraft Serial Number:	**469**
Year of Manufacture:	**2015**
Date and Time (UTC)[4]:	**7 September 2024 @ 17:30 hrs**
Location:	**Cloongoonagh, Co. Mayo, Ireland**
Type of Operation:	**Private**
Persons on Board:	**Crew – 1** **Passengers – Nil**
Injuries:	**Nil**
Nature of Damage:	**Substantial**
Commander's Licence:	**Private Pilot Licence (PPL) Microlight (M), issued by the Irish Aviation Authority (IAA)**
Commander's Age:	**58 years**
Commander's Flying Experience:	**566 hours, of which 34 were on type**
Notification Source:	**Pilot**
Information Source:	**AAIU Report Form submitted by the Pilot** **AAIU Field Investigation**

[4] **UTC**: Co-ordinated Universal Time. All times in this report are quoted in UTC unless otherwise stated; local time was UTC + 1 hour on the date of the accident.

SYNOPSIS

During an attempted landing on a grass runway at a private site at Cloongoonagh, Co. Mayo, the Pilot of the microlight aircraft elected to conduct a go-around manoeuvre due to a reported sudden drop in height. The engine power was increased, and the aircraft veered to the left. It impacted with a hedgerow located to the left of the runway, before coming to rest in an adjacent field. The Pilot, who was the sole occupant, exited the aircraft normally. No injuries were reported. There was no fire.

NOTIFICATION AND RESPONSE

The Pilot informed the AAIU by email on Sunday, 8 September 2024 (the day after the accident). When the AAIU contacted the Pilot, it was established that the aircraft had already been recovered from the accident site.

1. FACTUAL INFORMATION

1.1 History of the Flight

Earlier on the day of the accident, the Pilot flew the Aeroprakt A-22L2 microlight aircraft from a private site at Cloongoonagh, Co. Mayo, Ireland, to Tibohine Airfield, Co. Roscommon, Ireland. The Pilot then brought friends on two local sightseeing flights from Tibohine, following which he departed, alone, for a return flight to Cloongoonagh.

The Pilot reported that as the aircraft was approaching the runway threshold at Cloongoonagh, at a height of approximately 20 feet (ft), a sudden drop in height occurred, following which he applied power and right rudder to conduct a go-around manoeuvre (i.e. to reject the landing). He said that the left wing seemed to drop, and that the aircraft suddenly veered to the left. The aircraft impacted with a hedgerow, which ran parallel to the left side of the runway. It came to rest in an agricultural field on the other side of the hedgerow and was pointing back towards the hedgerow (**Photo No. 1**). The Pilot, who had been secured by a four-point harness, stated that he was uninjured and was able to exit the aircraft normally. There was no fire.

Photo No. 1: Position of aircraft post-accident (*photo provided by Pilot*)

1.2 Injuries to Persons

No injuries were reported to the Investigation.

1.3 Pilot's Statement and Interview

The Pilot said that the airspeed during the final approach was 85 kilometres per hour (the subject aircraft's airspeed indicator displays airspeed in '*KPH*') and that full flaps had been selected. He recalled that when he attempted to perform a go-around following a sudden drop in height, which he subsequently attributed to wind shear (**Section 1.9.2**), the aircraft '*veered very sharply and very quickly to the left.*' The Pilot reported that he thought that the left wing was dropping as he applied power and that he was able to lift the wing with '*right pressure on the stick*', but that this '*only enabled level flight through the hedge*'. The Pilot estimated that the speed at impact was 70 to 80 kilometres per hour and said that he was wearing his restraint harness. He noted that he had practised go-arounds on the subject aircraft but generally didn't practice them at the site in Cloongoonagh. The Pilot, who had previously operated a different aircraft type at the airstrip, informed the Investigation that he first landed the subject aircraft at Cloongoonagh on 1 June 2024 and never had any issues landing there prior to the accident.

1.4 Aircraft Information

1.4.1 General

The Aeroprakt A-22L2 is a two-seater, high-wing, metal-framed, 6.23 metre (m) long, microlight aircraft, with a wingspan of 9.55 m. The aircraft type is fitted with a fixed tricycle landing gear, with a 1.71 m track width[5]. The aircraft's wings are fitted with flaperons, which perform the functions of both ailerons and flaps. The wings, flaperons, and other control surfaces are fabric-covered. The aircraft type is powered by a Rotax 912 UL, four-cylinder, 80 Brake Horsepower (BHP) engine, fitted with a three-blade, fixed-pitch, composite propeller. The propeller rotates clockwise when viewed from the cockpit. The aircraft's maximum take-off weight is 472.5 kilograms (kg). The Aircraft Manufacturer's Pilot Operating Handbook (POH) states that the aircraft's stall speed with '*full flaps*', at '*maximum take-off weight and engine at idle*' is 52 kilometres per hour Indicated Airspeed (IAS). The POH (Section 3.3 '*Crosswind limitation*') quotes a maximum crosswind component of 14 knots (kt).

The validity certificate for the subject aircraft's flight permit was issued by the IAA on 20 May 2024 and was valid until 19 May 2025. A ballistically operated parachute recovery system was installed. The cockpit seats were fitted with four-point restraint harnesses. Records indicate that the total flight time of the aircraft up to the date of the accident was 1,358 hours and 15 minutes.

1.4.2 Operating Procedures

Section 7.12 ('*Short field landing*') of the POH states the following regarding flap setting and approach speed:

> '*1. Flaps – EXTEND FULLY.*
> *2*. […]
> *3. Approach speed on final – 90 km/h* [kilometres per hour] *(49 kts), +10 km/h (+5 kts) in rain or strong turbulence*'.

[5] **Track width:** The distance between the centreline of each main wheel.

Section 7.13 (Balked landing) states:

> *'1. Throttle – gradually FULL POWER.*
> *2. Descent – DISCONTINUE.*
> *3. Speed – accelerate to at least 100 km/h (54 kts) flying level.*
> […]'.

Section 5.2 (Take-off and landing distances) of the POH includes the following information regarding aircraft fitted with a Rotax-912 UL engine (**Table No. 1**)[6].

Take-off run [roll]:	135 m
Landing run [roll][7]:	135 m
Take-off distance to/from 15 m (50 ft):	250 m
Landing distance to/from 15 m (50 ft)[8]:	350 m

Table No. 1: Take-off and landing distances

1.5 Damage to Aircraft

The left wing sustained significant impact damage approximately halfway along its span (**Photo No. 2**). There was also impact damage to the leading edge, close to the wingtip. The right wing was distorted near its root. All three propeller blades were broken. The nose landing gear leg was bent, and the left rear organic glass[9] panel was fractured. The aircraft's ballistically operated parachute recovery system appeared to be undamaged and had not deployed during the occurrence.

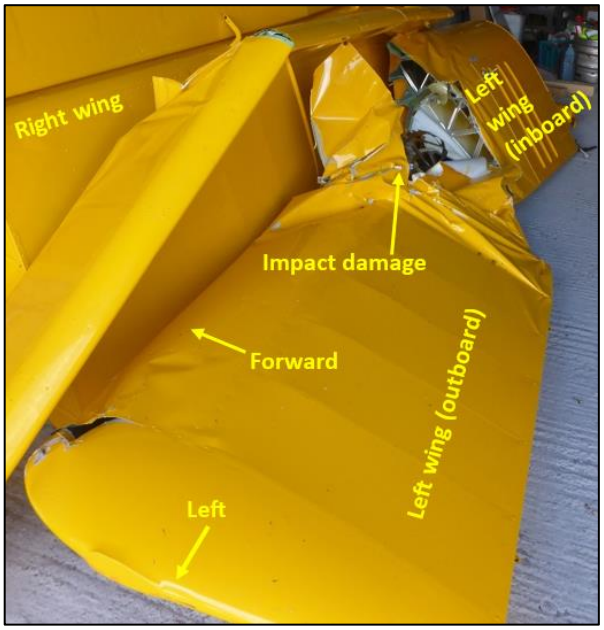

Photo No. 2: Damage to left wing (wings removed from aircraft)

[6] The POH table also included distances in feet. The Investigation found conversion errors in the distances in feet and informed the Aircraft Manufacturer of this. The Investigation was advised that the metre distances are correct and that the conversion errors would be corrected.
[7] **Landing run/roll:** The horizontal distance required once the aircraft's wheels contact the ground to the end of the landing ground roll; it takes no account of obstacles at the start or end of the runway surface.
[8] **Landing distance to/from 15 m (50 ft):** Horizontal distance from where the aircraft is at a height of 50 ft to the end of the landing ground roll (i.e. the landing distance required to clear a 50 ft obstacle).
[9] **Organic Glass:** Organic glass is a transparent thermoplastic material.

1.6 Other Damage

There was minor damage to the hedgerow which ran parallel to the left side of the runway.

1.7 Runway Information

1.7.1 General

The runway was located on a private site at Cloongoonagh, Co. Mayo. It was grass-covered and was orientated in the 04/22 direction (**Photo No. 3**). The Investigation measured it to be approximately 254 m long and 4.3 m wide. The approach was being made in the 04 direction (approximately north-easterly). There was a hedgerow located approximately 9 m from the left-hand edge of the runway (when viewed in the 04 direction). The section of hedgerow nearest the threshold contained several trees. A single-wire electric fence ran parallel to the right-hand side of the runway. The runway sloped upwards in the 04 direction for the first 150 m, gaining approximately 4 m of elevation, before sloping downwards for the final 100 m approximately. The elevation at each end was approximately 96 m Above Mean Sea Level (AMSL). The site was not licensed by the IAA, nor was it required to be.

The point of impact with the hedgerow was approximately 20 m from the 04 threshold. The threshold was located approximately 6 m from an embankment that bounded a public road, which was orientated approximately perpendicular to the runway. An embankment was also present on the other side of the road. The final approach in the 04 direction crossed overhead electrical cables that were fitted with warning markers. The cables were located approximately 78 m before the runway threshold. The ground elevation at the location of the cables was approximately 92 m (AMSL). The cables were at a height of approximately 8 m above the ground and at an elevation of approximately 100 m (AMSL). Dense trees were located approximately 100 m beyond the far end of the runway. A weathervane located to the side of the runway, close to its mid-point, was used to indicate wind direction. There was no windsock.

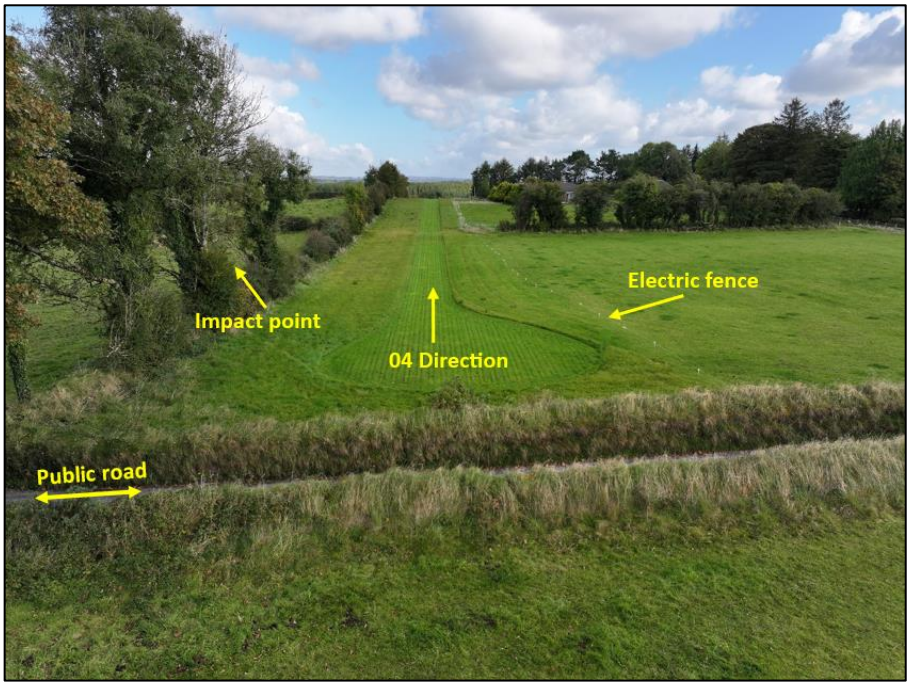

Photo No. 3: Runway and impact point

1.7.2 Guidance Material

As noted in a previous AAIU Investigation Report (No. 2023-009), the IAA published a Safety Promotion Leaflet (AED 1) on '*Risk from Obstacles at Aerodromes*', which is available on their website[10]. The leaflet notes that:

> '*Analysis of accidents and serious incidents over the last five years have highlighted an ongoing risk from obstacles at aerodromes. In some cases the primary cause of the accident was not the aerodrome obstacles, however, they have played a significant role in the severity of the outcome*.'

The following diagram (**Figure No. 1**) is included in the leaflet in a section titled '*Methods to Reduce the Risk*'. The diagram provides guidelines regarding obstacle-free areas and highlights that there should be a '*30 metre obstacle free zone from runway centreline*'.

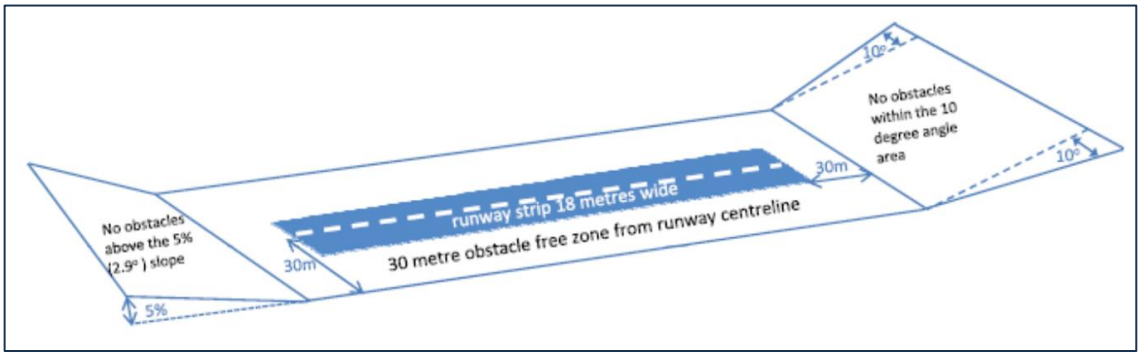

Figure No. 1: Guidance regarding obstacle-free zones (*IAA Safety Promotion Leaflet AED 1*)

Regarding overhead wires, the leaflet states that '*Typically aerodromes will have overhead wires, either electrical or communications wiring, near their location and these will pose a hazard to operating at the aerodrome*'. The leaflet advises to '[…] *engage with electricity and communication providers to relocate overhead wiring or, at least, have them more visible when they are in the flight path to and from your aerodrome*.'

1.8 Personnel Information

The Pilot held a PPL (M) which was issued by the IAA on 27 March 2023 and was valid until 26 March 2028. The Pilot's Class 2 (PPL) medical certificate was valid until 24 November 2024. His Light Aircraft Pilot Licence (LAPL) medical certificate was valid until 24 November 2025. The Pilot's Flying Experience is outlined in **Table No. 2**.

Total all types:	566 hours
Total on type:	34 hours
Total on type P1:	28 hours
Last 90 days:	24 hours (all on type)
Last 28 days:	2 hours (all on type)
Last 24 hours:	2 hours (all on type)

Table No. 2: Pilot's Flying Experience

[10] https://www.iaa.ie/docs/default-source/publications/corporate-publications/safety-leaflets/risk-from-obstacles-at-aerodromes.pdf?sfvrsn=4cab0df3_4 (accessed 27 November 2024).

1.9 Meteorological Information

1.9.1 Estimated Meteorological Conditions

Met Éireann, the Irish meteorological service, was asked to provide an aftercast of the meteorological conditions prevailing in the Cloongoonagh area at the time of the accident. The estimated conditions provided are outlined in **Table No. 3**.

Meteorological Situation:	A light north-easterly airflow covers Ireland.
Surface Wind: **Wind at 2,000 ft:** **Between surface and 300 ft:**	Varying between north-west and north-east, 3-5 knots (kt) Varying between north-west and north-east, 10-15 kt Varying between north-west and north-east, 4-8 kt
Visibility:	30 kilometres (km)
Weather:	Dry with sunshine
Cloud:	Few (1-2/8^{ths}) fair weather cloud, with bases between 2,000 ft and 2,500 ft
Surface Temperature/Dew Point:	21/16 degrees Celsius
Mean Sea Level (MSL) Pressure:	1011 hPa (Hectopascals)
Freezing Level:	12,000 ft

Table No. 3: Estimated meteorological conditions in the Cloongoonagh area

1.9.2 Wind Effects

The Pilot reported that a sudden drop in height occurred as the aircraft approached the runway threshold, which he subsequently attributed to wind shear.

The Federal Aviation Administration (FAA) of the United States, in its safety publication[11] on wind shear defines it as *'a change in wind speed and/or direction over a short distance. It can occur either horizontally or vertically* […].' The publication discusses various types of wind shear, including '*wind shear from surface obstructions'* which it states is *'generally associated with hangars or other buildings near the runway. The sudden change in wind velocity can seriously affect a landing*.'

Met Éireann was asked to comment on the possibility of wind shear in the area at the time of the occurrence and noted that the variable wind direction (north-westerly to north-easterly) could be a contributing factor to wind shear, but that significant variation in vertical wind speeds in the lowest hundreds of feet was not indicated in the available meteorological data.

[11] FAA publication FAA-P-8740 AFS-8 (2008) HQ 101130.

1.10 Propeller Effects

As outlined in a previous AAIU Investigation Report (No. 2021-012), and in numerous other aviation publications, the following factors can affect single-engine propeller-driven aircraft.

- Asymmetric loading (P-factor)
- Torque reaction
- Corkscrew effect (prop-wash)
- Gyroscopic precession

The first three effects listed above are depicted in **Figure No. 2**. The fourth effect listed (gyroscopic precession) is more applicable to tailwheel aircraft and therefore is not discussed further.

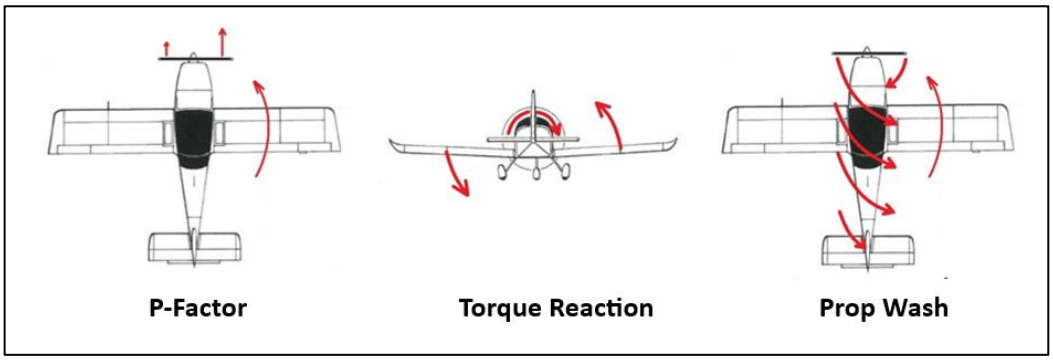

Figure No. 2: Propeller effects

1.10.1 P-Factor

P-factor is the term for asymmetric propeller loading which causes an aircraft to yaw when the propeller disc is not perpendicular to the relative airflow. In the case of a clockwise-rotating propeller, the descending right side of the propeller disc, as seen from the rear, has a higher angle of attack relative to the oncoming air, and thus generates a higher air flow and thrust than the ascending left side. This moves the propeller's aerodynamic centre to the right of the aircraft centreline, thus inducing an increasing yaw moment to the left. The effect increases with increasing angle of attack, such as when approaching to land, and with increasing engine power.

1.10.2 Torque Reaction

On aircraft with a clockwise-rotating propeller, a sudden increase in engine power will result in a torque reaction which will cause a tendency for the aircraft to roll (and yaw) to the left.

1.10.3 Prop-Wash

As a propeller pushes air backwards it imparts a helical/spiral rotation motion to that air. In the case of a clockwise-rotating propeller, as the air spirals around the fuselage it pushes against the left side of the vertical stabiliser, causing the aircraft to yaw to the left. This left-yawing tendency is compounded by the angle of attack of the spiralling air on the vertical stabiliser, which also induces a left yawing tendency. The prop-wash effect is at its greatest when the airflow is flowing more around the fuselage than along it, i.e. at high power and low airspeed, as would be the case during a go-around.

2. AAIU COMMENT

The Pilot was appropriately licensed for the flight and the aircraft's airworthiness certification was valid.

The Pilot reported that a sudden drop in height occurred as the aircraft approached the runway threshold, which he subsequently attributed to wind shear. The Investigation considers that the surface wind speed of 3-5 kt, as indicated by the meteorological aftercast, would not normally be conducive to wind shear. However, the variable wind direction when combined with local features, such as the trees in the hedgerow to the left of the runway threshold, and the public road, which was orientated approximately perpendicular to the runway, and which was bounded on both sides by embankments, could have resulted in some form of local adverse wind effect.

The Pilot said that full flaps had been selected, which is a requirement of the POH for a short field landing. The Pilot reported that the airspeed during the final approach was 85 kilometres per hour. This was only marginally below the 90 kilometres per hour specified in the POH and significantly above the 52 kilometres per hour (full flap) stall speed; therefore it was unlikely to have been a factor in the drop in height.

The meteorological aftercast indicated that the surface wind was coming from a north-westerly to north-easterly direction at 3-5 kt. If the wind was coming primarily from the north-west, it would have resulted in a crosswind from the left of up to 5 kt during an approach in the 04 direction. The maximum crosswind component, as stated in the POH, is 14 kt. Therefore, the crosswind was within the specified limitation.

The Pilot said that when he elected to go-around, he applied engine power. The resulting torque reaction would induce a roll to the left. In addition, prop-wash and P-factor would produce a yawing moment to the left. The Pilot said that he applied right rudder (which would be normal to counteract the left turning tendency) and also applied right pressure on the stick to lift the dropping left wing. However, the aircraft has a wingspan of 9.55 m, which would result in the wingtips protruding over the edges of the 4.3 m-wide runway by approximately 2.6 m. The hedgerow located to the left of the runway was approximately 9 m from the left edge of the runway (11.15 m from the runway centreline) and therefore if the aircraft was aligned with the runway centreline and at a low height, there would only be approximately 6 m clearance between the left wingtip and the hedgerow. It would likely be challenging to track the runway centreline during a go-around initiated in the final moments of an approach, and when travelling in the order of 80 kilometres per hour (22 metres per second), a deviation to the left would result in the limited wingtip clearance being quickly lost. Following impact with the hedgerow, the aircraft would have pivoted about the left wing as it travelled through the hedgerow. This, combined with the subsequent ground impact, were likely factors in the aircraft coming to rest facing back towards the hedgerow.

The Pilot reported that he had no issues landing at the airstrip on previous occasions. While acknowledging the difficulties in locating runways at private sites clear of all obstacles, the Investigation notes the IAA's Safety Promotion Leaflet on '*Risk from Obstacles at Aerodromes*', which highlights that there should be no obstacles within 30 m of either side of the runway centreline. The leaflet states that although the primary cause of an accident may not be the obstacle itself, the obstacle can play '*a significant role in the severity of the outcome.*' The proximity of the hedgerow to the left of the runway significantly increased the severity (and likelihood) of this occurrence. The leaflet also draws attention to the hazards of overhead cables. However, in this case, the cables (elevation 100 m) were located approximately 78 m from the runway threshold and were only 4 m above the height of the threshold (elevation 96 m). The cables were also marked with warning markers and were not identified by the Pilot as being a factor.

The POH states that the landing distance required from a height of 50 ft is 350 m and the landing roll distance is 135 m (the horizontal distance required once the aircraft's wheels contact the ground). The runway length, as measured by the Investigation, was 254 m, which is greater than the landing roll distance required; however, the length was such that it may have necessitated a shallow approach angle to facilitate touching down close to the threshold. A shallow approach angle could result in overflying the public road at a low height and also make the aircraft more susceptible to any local adverse wind conditions.

- 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.

Produced by the Air Accident Investigation Unit

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

An Roinn Iompair
Department of Transport

Air Accident Investigation Unit,
Department of Transport,
Leeson Lane,
Dublin 2,
D02TR60,
Ireland.
Telephone: +353 1 804 1538 (24x7)
Email: info@aaiu.ie
X (formerly Twitter): @AAIU_Ireland