



# **Air Accident Investigation Unit Ireland**

**FACTUAL REPORT**

**SERIOUS INCIDENT**

**ROBIN HR200-100, D-EIIL**

**Dowth Hall Airstrip, Co. Meath**

**10 August 2021**



**An Roinn Iompair**  
Department of Transport

# FINAL REPORT

## 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<sup>1</sup> to the Convention on International Civil Aviation, Regulation (EU) No 996/2010<sup>2</sup> and Statutory Instrument No. 460 of 2009<sup>3</sup>, 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.

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<sup>1</sup> **Annex 13:** International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.

<sup>2</sup> **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.

<sup>3</sup> **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 No. 460 of 2009, the Chief Inspector of Air Accidents, on 11 August 2021, appointed Howard Hughes as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

<b>Aircraft Type and Registration:</b>	ROBIN HR200-100, D-EIIL	
<b>No. and Type of Engines:</b>	1 x Lycoming O-235-H2C	
<b>Aircraft Serial Number:</b>	34	
<b>Year of Manufacture:</b>	1974	
<b>Date and Time (UTC)<sup>4</sup>:</b>	10 August 2021 @ 19.00 hrs	
<b>Location:</b>	Dowth Hall Airstrip, Co. Meath, Ireland	
<b>Type of Operation:</b>	General Aviation	
<b>Persons on Board:</b>	Crew – 2	Passengers – Nil
<b>Injuries:</b>	Crew – Nil	
<b>Nature of Damage:</b>	Substantial	
<b>Commander's Licence:</b>	Private Pilot Licence (PPL) Aeroplanes (A), issued by the Irish Aviation Authority (IAA)	
<b>Commander's Age:</b>	50 years	
<b>Commander's Flying Experience:</b>	441 hours, all of which were on type	
<b>Notification Source:</b>	Flying Club	
<b>Information Source:</b>	AAIU Field Investigation AAIU Report Forms Submitted by the Crew	

<sup>4</sup> **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 day of the accident.

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### SYNOPSIS

During a landing at a private airstrip at Dowth Hall, the aircraft touched down hard and bounced, before touching down again. The nose landing gear was damaged during the landing, which caused the aircraft to veer to the left, and depart the side of the runway. The two occupants were uninjured and exited the aircraft normally. There was no fire.

### NOTIFICATION

The AAIU was notified of the accident by the Pilot's flying club shortly after it occurred. Two Inspectors of Air Accidents deployed to the accident site and commenced an investigation.

### PREAMBLE

The subject aircraft, a Robin HR200-100, was being used by a flying club as a temporary replacement, whilst the club's regular aircraft, a Robin HR200-120B was undergoing maintenance.

The subject aircraft was registered in Germany. The labelling of levers, switches, and instrumentation in the cockpit was in the German language, as was the Airplane Flight Manual (AFM) that accompanied the aircraft. The subject aircraft also had an additional wing flap setting, compared to the Robin aircraft previously used by the club.

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## 1. FACTUAL INFORMATION

### 1.1 History of the Flight

The aircraft, with the Pilot and an Instructor on board, took-off from Navan Airfield, EIHH, Co. Meath, at 18.20 hrs. The aircraft performed three circuits and touch-and-go landings on runway (RWY) 27. Following this, the aircraft was flown directly to Dowth Hall private airstrip, Co. Meath, with the intention of performing further circuits and touch-and-go landings. A visual approach to RWY 25 was performed by the Pilot. The touchdown was hard and the aircraft bounced, becoming airborne in ground effect for approximately 70 m, before touching down again. Following the second touchdown the aircraft veered to the left, and departed the side of the runway. The Instructor assumed control of the aircraft and noted that the engine was providing significant power but that the throttle could not be retarded to the idle position. He shut down the engine by pulling the mixture control, and switching off the magnetos, as the aircraft travelled 71 m through long grass located to the left of the runway, and came to rest 22 m to the south of the runway centre line (**Photo No. 1**). Both occupants exited the aircraft normally. No injuries were reported to the Investigation. There was no fire.



**Photo No. 1:** Final position of the aircraft (*courtesy of the Pilot*)

## 1.2 Interview with the Instructor

The Instructor informed the Investigation that the Pilot had asked to be accompanied on a flight that was intended to be a refresher flight, as the Pilot had not flown for over a year. The Instructor informed the Investigation that he (the Instructor) was the Pilot in Command (PIC) of the subject flight.

The Instructor said that the Pilot operated as the handling pilot for the flight, which commenced at EIHH, where a take-off and three circuits including touch-and-go landings were performed. The Instructor said that these proceeded normally, and he had no comment to make concerning the Pilot's handling of the aircraft. The Instructor stated that after the third circuit, the flight proceeded to Dowth Hall, with the intention of carrying out additional circuits.

The Instructor informed the Investigation that an approach was conducted to the westerly runway at Dowth Hall (RWY 25). He stated that the Pilot had briefed for a Short Field Landing technique. This involved the use of full flap, and an approach speed of 62 kt. The Instructor also noted that this was the normal approach and landing technique used by the flying club when landing on grass runways in the club's Robin HR200 aircraft.

The Instructor stated that as the aircraft turned onto the final approach, full flaps were selected, the aircraft was re-trimmed, and the approach was stable throughout. The Instructor noted that as the aircraft crossed the boundary hedge to the airstrip, the Pilot closed the throttle and began to flare for landing. The Instructor stated that the aircraft developed a high pitch-up attitude, during which he called for the Pilot to 'go round'. The Instructor estimated that at this stage, the aircraft was approximately 10-15 feet above the ground and 'dropped' suddenly, which resulted in a hard landing. The Instructor said:

*'As soon as this [hard landing] occurred the RPM of the engine increased and the aircraft veered off the runway to the left. I immediately asked the Pilot Handling to*

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*close the throttle and when this did not happen I pulled back on the centre throttle lever which did not have any effect. I then pulled the mixture, killed both magnetos and applied full brakes. The engine shut down and the aircraft came to a halt. We then shut down the aircraft fully and exited the plane. Neither of us had any injuries’.*

The Instructor informed the Investigation that he believed the aircraft stalled once the engine throttle was closed and the aircraft was pitched up in the flare prior to landing, but given the height of the aircraft above the runway, he (the Instructor) was unable to react quickly enough to recover the aircraft.

### 1.3 Interview with the Pilot

The Pilot informed the Investigation that this was a refresher flight, as his last flight as a pilot in command was on 21 January 2020. The Pilot informed the Investigation that he (the Pilot) believed he was acting in the capacity of Pilot in Command Under Supervision of the subject flight.

He stated that having completed three circuits at EIHH, the traffic pattern there was becoming busy, so they flew to Dowth Hall with the intention of carrying out some additional circuits. The Pilot said that he joined the circuit on a left downwind for the westerly runway at Dowth Hall and turned onto the final approach at an altitude of 600-700 ft. The Pilot stated that the aircraft *‘crossed the hedge at approximately 60 kt and I probably commenced the flare too early at approximately 25 ft.’*

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The Pilot said that the aircraft then descended to about 6 ft and that the Instructor said to go-around. The Pilot informed the Investigation that he applied engine power but at the same time the plane dropped *‘firmly and hard to the ground’*. The Pilot stated that the *‘throttle became stuck with the engine at approximately 1800 rpm’* and the aircraft turned to the left and travelled along the ground into the long grass to the south of the runway. As the aircraft exited the runway the Pilot said to the Instructor *‘you have control’*. The Instructor brought the aircraft to a halt by shutting down the engine. There was no damage to the cockpit and both occupants exited the aircraft.

The Pilot informed the Investigation that they had briefed for a Short Field Landing technique, involving the use of full flap, and an approach speed of 62 kt.

The Pilot noted that the subject aircraft had a different landing flap setting when compared to the other Robin HR200 aircraft he had previously flown, see **Section 1.4.2**.

### 1.4 Aircraft Information

#### 1.4.1 General

The Robin HR200-100 is a single-engine, all-metal, two-seat<sup>5</sup>, low-wing airplane, with conventional tail, and fixed tricycle landing gear. The aircraft is powered by a Lycoming O-235-H2C engine. The airspeed indicator fitted to the subject aircraft was graduated in kilometres per hour and knots.

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<sup>5</sup> The two cockpit seats are in a side-by-side configuration.



The subject aircraft was registered in Germany, and was issued with a Certificate of Airworthiness by the German aviation regulator in 1974. The aircraft had been issued with an Airworthiness Review Certificate in March 2021, which was valid until 30 April 2022.

#### 1.4.2 Club Aircraft

The subject aircraft was being used by a flying club based at EIHH, of which both the Pilot and the Instructor were members. The Investigation was informed that previously the flying club was operating a later version of the Robin HR200 aircraft (the HR200-120B), but that these aircraft were temporarily unavailable as they were undergoing maintenance. In order to have a Robin HR200 available to Club members, the flying club had leased the subject aircraft. The Pilot informed the Investigation that there was a difference in flap settings on the subject aircraft, compared to those of the previous Robin aircraft used by the flying club. The Pilot noted that the subject aircraft had a landing flap setting of 30° as opposed to 20° on the previous Robin HR200 aircraft he had flown.

In flight, use of Flap 30° will result in a greater amount of drag compared to flap 20°, and thus a more rapid decrease in airspeed when engine power is reduced.

#### 1.4.3 Before Landing Checklist

The Investigation notes that the checklists present in the aircraft were for a Robin HR200-120B, registration G-GMKE. The Final Approach Check section of these checklists advised that the airspeed, with full flap deployed, should be 70 kt.

The approved German language AFM, which was located in the aircraft, contained the Before Landing Checks for the subject aircraft. This showed that the final approach should be flown at between 120 and 125 km/h, with Flap 30° selected. (120-125 km/h is equivalent to 64.8-67.5 kt).

#### 1.4.4 Short Landing

The AFM for the Robin HR200-120B contains a 'Short landing' procedure which states:

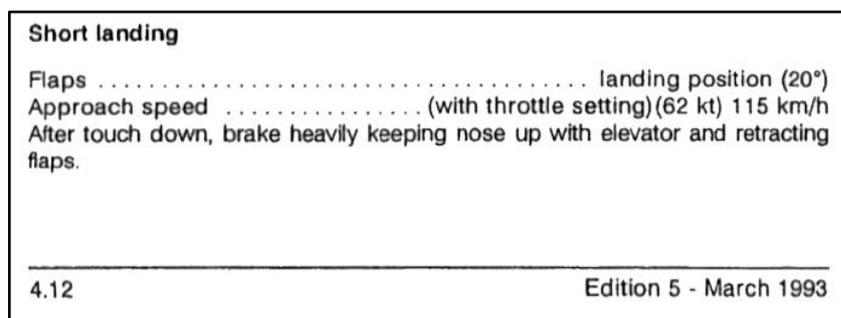


Figure No. 1: Copy of Short Landing procedure from HR200-120B AFM

A review of the Normal Procedures section of the HR200-100 AFM did not indicate that an equivalent procedure for 'Short Landing' was set out for the HR200-100.

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## 1.5 Damage to Aircraft

The aircraft's nose landing gear sustained substantial damage. Damage to the nose landing gear steering linkage resulted in the nose landing gear pointing approximately 25° left of the longitudinal axis of the aircraft (**Photo No. 2**).



**Photo No. 2:** Photo showing distortion to nose landing gear (*courtesy of the Pilot*)

The nose landing gear leg was distorted approximately 6° to the left of its normal vertical orientation. In addition, the throttle linkage to the engine carburettor is routed close to parts of the nose landing gear assembly.

Due to the distortion of the nose landing gear leg, the throttle linkage became damaged and partially trapped against the throttle control casing clamp support bracket, **Photo No. 3**.

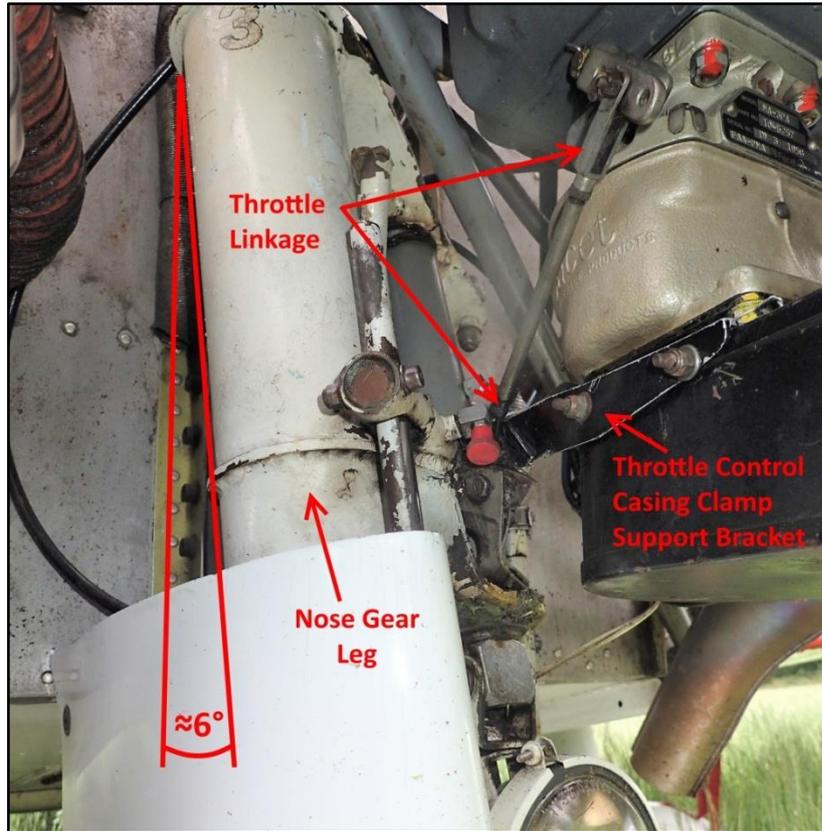


Photo No. 3: View showing distortion of nose landing gear assembly

## 1.6 Site Survey

The Investigation carried out an inspection of the runway surface from the start of RWY 25, to the point at which the aircraft came to rest. Ground scars on the grass runway surface, 86 m from the boundary hedge at the beginning of RWY 25, indicated where the aircraft first touched down during the landing (**Photo No. 4**).

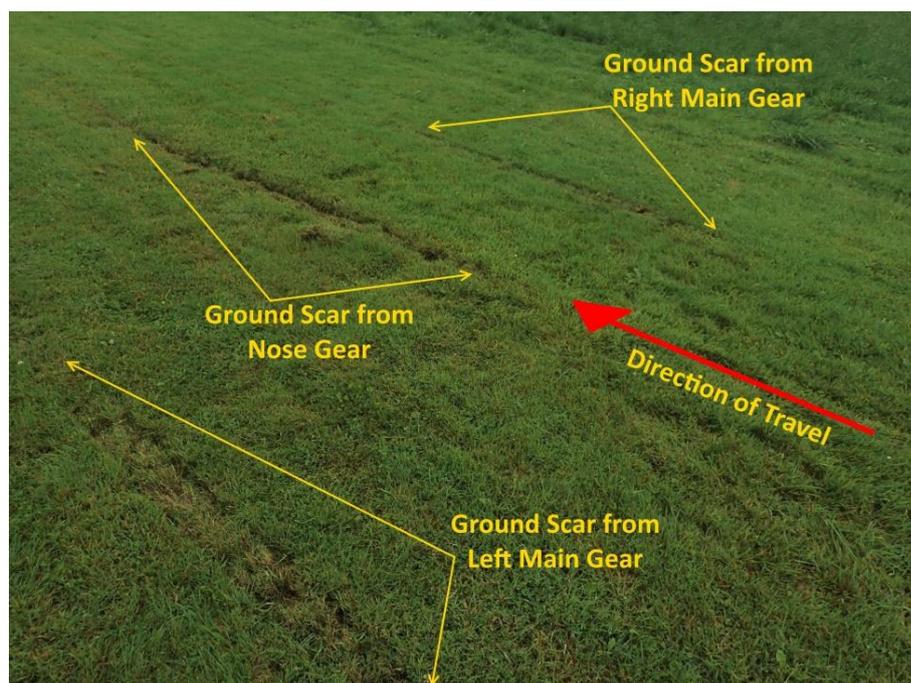
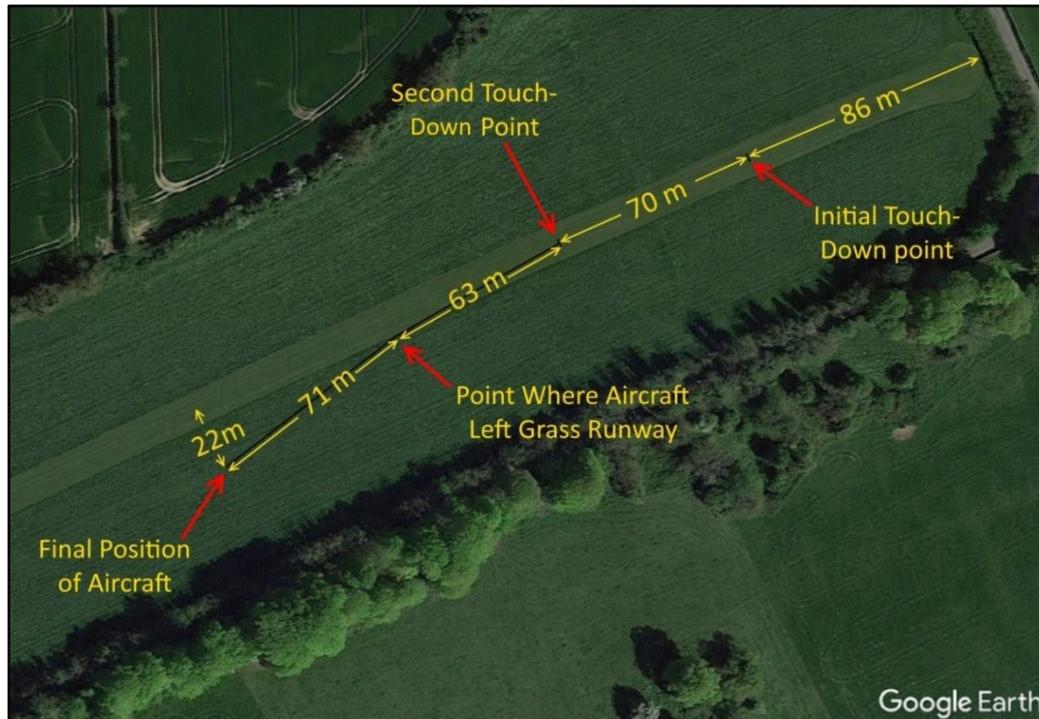


Photo No. 4: Ground Scars at Initial Touch-down Point on RWY 25

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Following the initial touch-down, there were no marks or tracks on the runway until approximately 70 m further along the runway, where there was a second set of wheel marks from all three of the aircraft's wheels. From this point, the wheel marks continue until the final resting position of the aircraft, approximately 290 m from the beginning of the runway, and 204 m from the initial touchdown point (**Figure No. 2**).



**Figure No. 2:** Plot of site survey measurements

## 1.7 Injuries to Persons

No injuries were reported to the Investigation.

## 1.8 Personnel Information

### 1.8.1 The Instructor

The Instructor held a PPL(A), which was issued by the IAA on 22 December 2014. The Instructor's Single-engine piston (SEP) (land), rating was valid until 31 October 2022. The Instructor also held a valid Class Rating Instructor (CRI) (Aeroplane) certificate. The Instructor's Class 2 Medical Certificate was valid until 16 August 2022.

The Instructor's flying experience is outlined in **Table No. 1**.

<b>Total hours (all types):</b>	441 hours
<b>Total on type (P1):</b>	367 hours
<b>Last 90 days (all on type):</b>	19 hours
<b>Last 28 days (all on type):</b>	3 hours
<b>Last 24 hours (all on type):</b>	0 hours

**Table No. 1:** Instructor's Flying Experience



The Instructor had flown in the subject aircraft on two occasions prior to the occurrence flight, and was familiar with Dowth Hall airstrip.

### 1.8.2 The Pilot

The Pilot held a PPL(A), which was issued by the IAA on 20 January 2021. The Pilot's SEP (land) rating was valid until 31 January 2022. The Pilot's Class 2 Medical Certificate was valid until 23 September 2021.

The Pilot's flying experience is outlined in **Table No. 2**.

<b>Total hours (all types):</b>	249 hours
<b>Total on type (P1):</b>	11 hours
<b>Last 90 days (all on type):</b>	0 hours
<b>Last 28 days (all on type):</b>	0 hours
<b>Last 24 hours (all on type):</b>	0 hours

**Table No. 2:** Pilot's Flying Experience

The Pilot had not flown in the subject aircraft prior to the occurrence flight, and had not landed at Dowth Hall airstrip prior to the occurrence flight.

### 1.9 Recency Requirements

Part-FCL, ANNEX I, SUBPART A – GENERAL REQUIREMENTS, of Regulation (EU) 1178/2011 states:

#### ***FCL.060 Recent experience***

*(b) Aeroplanes, helicopters, powered-lift aircraft and airships. A pilot shall not operate an aircraft in commercial air transport or to carry passengers:*

*(1) as PIC or co-pilot unless he/she has carried out, in the preceding 90 days, at least 3 takeoffs, approaches and landings in an aircraft of the same type or class or an FFS<sup>6</sup> representing that type or class. The 3 take-offs and landings shall be performed in either multi-pilot or single-pilot operations, depending on the privileges held by the pilot; [...]*

ED Decision 2011/016/R which contains Acceptable Means of Compliance (AMC) and Guidance Material to Part FCL, states:

#### ***AMC1 FCL.060(b)(1) Recent experience***

*When a pilot needs to carry out one or more flights with an instructor or an examiner to comply with the requirement of FCL.060(b)(1) before the pilot can carry passengers, the instructor or examiner on board those flights will not be considered as a passenger.*

<sup>6</sup> FFS: Full Flight Simulator

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### 1.10 Meteorological Information

'Met Éireann', the Irish meteorological service, provided the Investigation with an aftercast of the weather conditions at the time and location of the accident (**Table No. 3**).

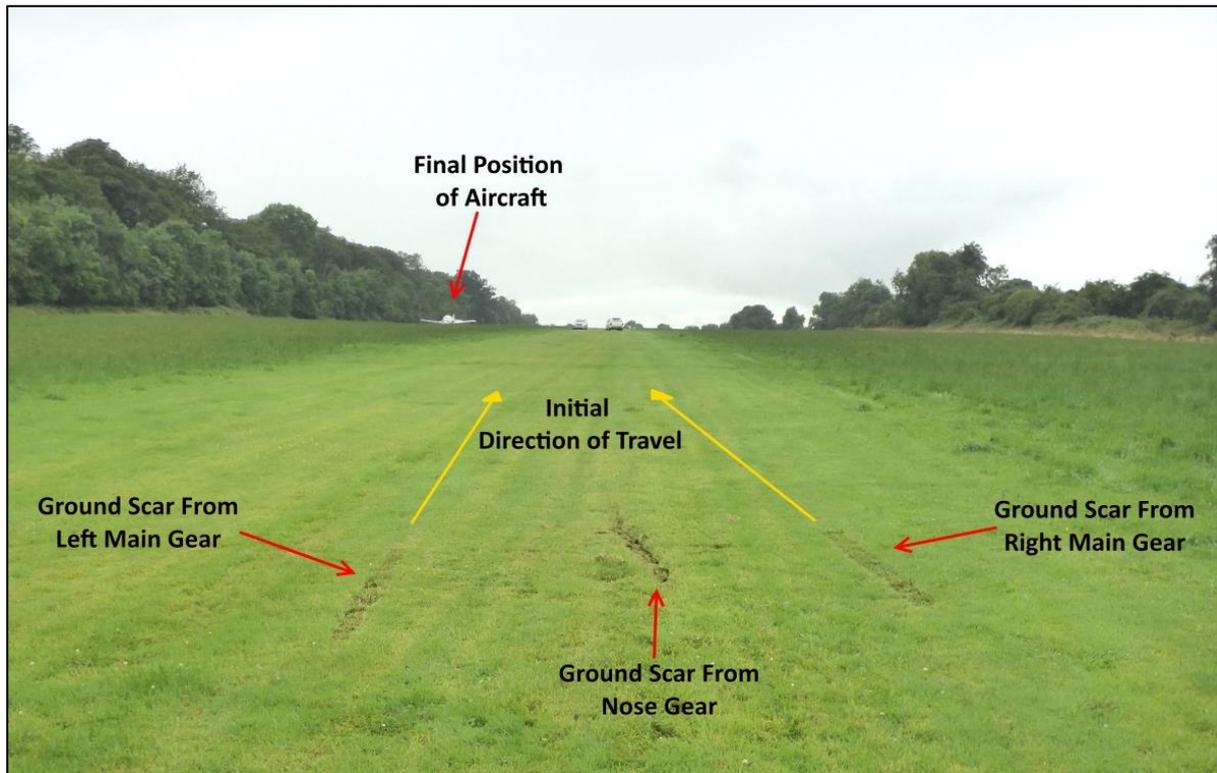
<b>Meteorological Situation:</b>	A slack airflow with a weak ridge of high pressure covered Ireland
<b>Surface Wind:</b>	Southerly 2-4 KT.
<b>Wind at 2,000 feet (ft):</b>	South to Southwest 7-10 KT.
<b>Between Surface and 300 ft:</b>	Similar to surface
<b>Visibility:</b>	30 km+.
<b>Weather:</b>	Cloudy and dry.
<b>Cloud:</b>	Few (1-2/8th oktas) status clouds with bases around 2,000-2,500 feet and a broken (5-7/8th oktas) layer of stratocumulus clouds with bases around 4,500 feet.
<b>Surface Temperature/Dew Point:</b>	17/12 degrees Celsius.
<b>Mean Sea Level (MSL) Pressure:</b>	1014 hPa [hectoPascals].
<b>Freezing Level:</b>	10,000 feet.
<b>Other Comments:</b>	Nil.

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**Table No. 3:** Aftercast of Weather Conditions at the time of the Accident

### 1.11 Aerodrome Information

Dowth Hall is a private airstrip located in county Meath. It has one grass runway – RWY 07/25 (**Photo No. 5**). The runway length is approximately 1,000 m long. The runway width was measured and found to be approximately 12 m.



**Photo No. 5:** View along RWY 25 at Dowth Hall airstrip showing Ground Scars from Aircraft Landing Gear at Initial Touchdown point

RWY 25 at Dowth Hall has an upslope which varies along its length. Using survey data for the area, including the runway, the Investigation determined the runway slope to be as follows:

- First third 3.7% (2.1° upslope)
- Mid third 2.0%
- Last third 0.7%

The Investigation notes that the westerly runway used at EIHH for the initial circuits of the subject flight, has a very slight downhill slope of approximately 0.5°.

### 1.12 Additional Information

An FAA pilot safety brochure titled '*Spatial Disorientation Visual Illusions*', notes that:

*'Pilots learn to recognize a normal final approach by developing and recalling a mental image of the expected relationship between the length and the width of an average runway, [...]*

*A final approach over a flat terrain with an upsloping runway may produce the visual illusion of a high-altitude final approach.'*

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## 2. AAIU COMMENT

The Instructor and the Pilot were appropriately licensed for the flight and the aircraft's Airworthiness Review Certificate was valid.

The Pilot had not conducted three take-offs and landings in the 90 days prior to the occurrence flight, and therefore, as per Part FCL.060, was not permitted to carry passengers. Although the Pilot was entitled to perform three take-offs and landings solo, as he had not flown for over a year and a half, he elected to fly with an instructor. As such, the Instructor was on board the aircraft in the capacity as PIC.

The damage to the nose landing gear, and the ground impact marks where the aircraft made its initial contact during landing at Dowth Hall, indicate that the aircraft touched down hard, with a pronounced nose-down attitude. The Pilot noted that he '*probably commenced the flare too early*'. Although the Instructor called for a go-around, it was likely that there was insufficient height above the runway for the Pilot to react. The Instructor considered that a stall occurred once the engine power was removed and the aircraft was pitched up. Following the hard impact, damage to the nose-gear caused the aircraft to turn left as it continued the landing roll. In addition, the throttle became jammed in a partially open position due to distortion of the nose-gear leg against the throttle control casing clamp support bracket, both of which contributed to the aircraft departing the side of the runway.

The Investigation notes the following factors, which may have contributed to the hard landing:

- The handling Pilot's lack of recency.
- The handling Pilot's lack of familiarity with the different landing flap setting used on this variant of the aircraft, and how the use of flap 30° might result in a more rapid reduction in airspeed when engine power was reduced.
- The handling Pilot's lack of familiarity with Dowth Hall airstrip, and the up-slope at the beginning of RWY 25.
- Possible visual illusion of a steep final approach path to RWY 25 at Dowth Hall due to the upslope on the runway, contributing to an early flare and power reduction, resulting in a loss of airspeed and stall.
- As the handling Pilot had just completed three successful touch-and-go landings at EIHH, the Instructor did not anticipate that there would be a difficulty with the handling Pilot landing the aircraft at Dowth Hall airstrip.
- Although the Instructor called for a go-around, there was insufficient time to effect a recovery.

In addition, the Investigation notes that the labelling of levers, switches, and instrumentation in the cockpit was in the German language, as was the AFM that accompanied the aircraft and that the Checklist on board the aircraft was for a different variant of the aircraft type.

- 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](http://www.aaiu.ie)



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