Air Accident Investigation Unit Ireland

SYNOPTIC REPORT

ACCIDENT

Cessna F172P Skyhawk, EI-SKP

Abbeyshrule Airfield, Co. Longford

26 September 2020

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 and contributory 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.

[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 No. 460 of 2009, the Chief Inspector of Air Accidents, on 26 September 2020 appointed Leo Murray as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	Cessna F172P Skyhawk, EI-SKP
No. and Type of Engines:	1 x Lycoming O-320-D2J
Aircraft Serial Number:	F17202101
Year of Manufacture:	1981
Date and Time (UTC)[4]:	26 September 2020 @ 09.25 hrs
Location:	Abbeyshrule Airfield, Co. Longford
Type of Operation:	General Aviation – Training
Persons on Board:	Crew – 1 Passengers – Nil
Injuries:	Crew – 1 (Minor)
Nature of Damage:	Substantial
Commander's Licence:	Solo Student authorised in accordance with EASA Part FCL.020
Commander's Details:	Aged 26 years
Commander's Flying Experience:	43 hours, of which 5.5 hours were on type
Notification Source:	Approved Training Organisation (ATO)
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; to obtain local time, add one hour.

SYNOPSIS

The Student Pilot was returning to the departure airfield following a solo general handling exercise. The approach was high and fast, and following the initial touchdown, the aircraft bounced. The aircraft then contacted the runway, nose-wheel first, and following further bounces, was brought to rest on the runway with substantial damage. The Student sustained a minor injury subsequent to exiting the aircraft. There was no fire.

NOTIFICATION

The AAIU Inspector-on-call was notified by the ATO following the occurrence and after the aircraft had been moved from the runway. Two Inspectors of Air Accidents deployed to Abbeyshrule Airfield (EIAB) and commenced an Investigation.

1. FACTUAL INFORMATION

1.1 History of the Flight

The aircraft departed EIAB at 08.25 hrs on a solo training exercise in the local training area situated to the east of the airfield. The Student carried out general handling exercises as assigned by his Instructor. On return to the airfield, it was the Student's intention to carry out some circuit practice.

The Student made his approach to runway (RWY) 28. He estimated his airspeed on approach to be 65–70 knots (kts) with flaps set to 30 degrees – the standard landing flap setting. The Student realised that the aircraft was high on the approach but decided to continue with the approach and landing. According to witness information, the aircraft landed long and fast. Witness statements supported by a video recording of the landing show that, following the initial touchdown, the aircraft became airborne again. It subsequently contacted the runway in a nose-down attitude and bounced again before remaining on the runway.

The nose-down attitude of the touchdowns significantly damaged the nose landing gear. The upper and lower nose undercarriage (oleo) attachment brackets fractured, allowing the nose landing gear to rotate forwards which permitted the rotating propeller to contact the runway surface. The Student kept the aircraft on the runway following the final bounce and brought it to a stop just past the intersection with Taxiway (TWY) C South. Following an attempt to taxi, the Student made a call on the airfield frequency that he '*needed assistance*' and secured the aircraft by completing the shutdown checks. He exited the aircraft normally but sustained a minor injury after he exited the aircraft. There was no fire.

1.2 Witness No. 1

This witness was situated in the vicinity of the northern apron and observed the aircraft on approach. The witness thought the aircraft was '*fast and long*' and that it looked like it was going '*too fast to land*'. He thought the Pilot was trying '*to force it down*'.

His recollection was that it contacted the runway near the intersection with Taxiway (TWY) A North, nose-wheel first and the aircraft bounced. He said there was no attempt to take-off again, but that the aircraft left the ground by about two to three metres (m). He observed the nose descend again and thought that the oleo or the nose-wheel tyre had failed on this touch down – the main wheels touched down after this. The witness said that the aircraft became airborne again, then returned to the ground, nose-wheel first and that the speed had dropped at this stage. The witness reported that the aircraft veered left with the nose close to the ground and he thought that the propeller struck the runway following the second bounce. The aircraft came to a stop near the second intersection at TWY C South and the witness said that power was applied possibly in an attempt to taxi the aircraft. The witness stated that he initially remained on the club apron, close to the fire tender and then approached the aircraft.

1.3 Witness No. 2 (Instructor)

This witness was the Instructor that authorised the Student for the flight. The Student was on 'Phase 2' of a part-time Private Pilot Licence training course, solo flight consolidation. The exercise required the Student to depart the airfield to the training area for general handling exercises, before returning to the airfield for circuit practice.

The Instructor was situated at the ATO facility on the North Apron. He did not see the initial approach but did see the landing. The Instructor stated that the Student had landed '*heavily*' on the main gear and bounced, and opined that he had possibly *'pushed forward on the control yoke, causing the aircraft to impact on its nose-wheel'*; it touched-on again with the main wheels and bounced a second time on to its nose-wheel. On seeing the aircraft come to a stop, the Instructor took his high-vis tabard and portable radio and closed the runway as there were two items of local traffic airborne at the time. The Instructor was one of the first to arrive at the aircraft and, by this time, the Student had exited the aircraft. The aircraft was pushed clear of the runway and brought to the maintenance hangar at the north parking area.

When asked about the wind conditions at the time, the Instructor described the wind as *'very light'* and supplied wind reports from the two nearby meteorological reporting stations (Athlone and Mullingar) which reported the wind conditions as: 330 degrees at 4 kts and, 300 degrees at 5 kts respectively.

1.4 Licensing Information

Under EASA Part FCL.020, a student pilot may fly solo when authorised by a flight instructor, without a licence but must be in possession of a Medical Certificate. The Student was properly authorised for the flight by his Flight Instructor, who held a Commercial Pilot Licence (Aeroplanes) issued on 2 May 2018 with a Single Engine Piston (Land) Class Rating. The Instructor also held a Flight Instructor Rating for aeroplanes, valid from 6 September 2019 to 30 September 2022. The Student was the holder of an Irish Aviation Authority (IAA) Class 2 Medical Certificate issued on 10 December 2019 and valid until 10 December 2024.

1.5 Aircraft Inspection

Prior to the arrival of the AAIU, the aircraft had been recovered to the maintenance ramp where the upper and lower engine cowlings had been removed. The nose of the aircraft was supported by stand equipment as the nose oleo had separated from the aircraft. The nose gear and propeller sustained considerable damage due to impact and the engine was likely shock-loaded. The top alignment bolt of the nose oleo had sheared due to the heavy impact (**Photo No. 1**).

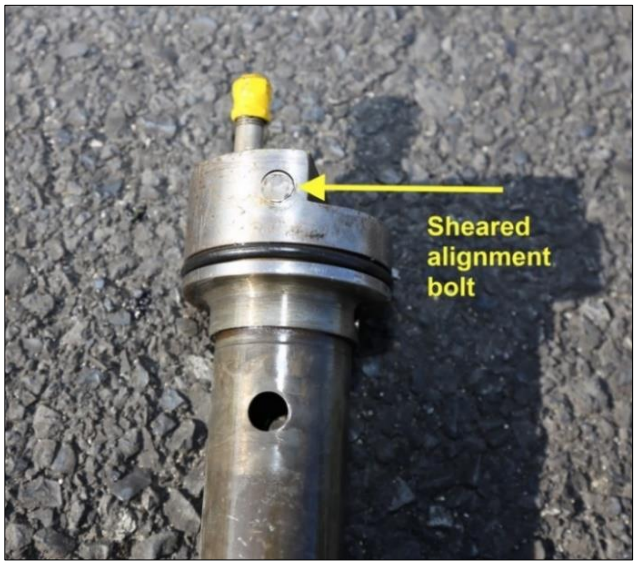


Photo No. 1: Sheared alignment bolt at top of oleo assembly

This shearing of the top alignment bolt allowed the inner tube of the oleo to exit upwards from the top of the oleo housing. The top attachment bracket between the nose leg and the firewall was separated from the primary airframe structure due to rivet shear; the bottom bracket had also sheared and separated from the structure. The bottom bracket is designed to separate from the structure (by means of rivet shear, rather than the bracket itself shearing) in the event of a gross overload to protect the primary airframe structure from buckling damage. The top and bottom bracket attachment failures are illustrated in **Photo No. 2**.

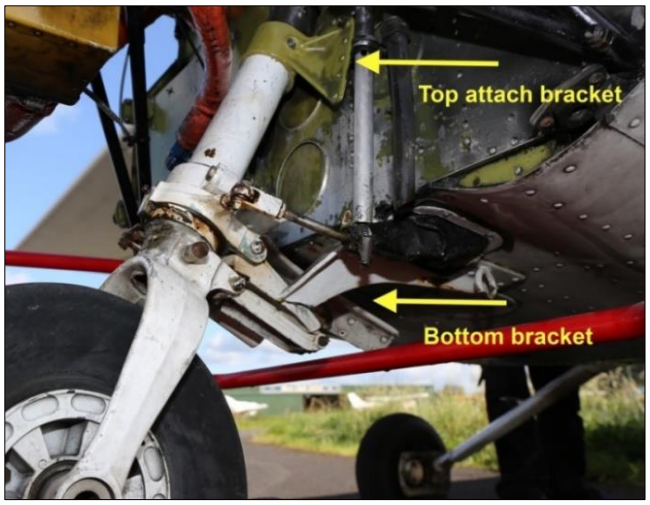


Photo No. 2: Damage to nose oleo upper and lower attachment brackets

As a result of the bracket failures, the nose leg rotated forwards, allowing the nose of the aircraft to drop and causing the propeller, which remained under power, to contact the runway. Both propeller blades showed evidence of runway contact, with resulting likely shock-loading of the engine.

The aircraft was subsequently repaired and returned to service.

1.6 Approved Training Organisation (ATO)

The ATO was approved under Regulation (EU) No. 1178/2011 on 16 November 2015. For operational reasons, flight training activities were transferred on a temporary basis from Weston Airport (EIWT), the Operator's normal base, to EIAB during the first week of August 2020.

1.7 Student Training

The Student had received credit for previous training carried out between November 2010 and June 2013. During this time, he completed a total of 21 hours of flight training including two hours, twenty five minutes on the Cessna 172 type. He made his first solo flight on 3 June 2013 in a Cessna 152. He discontinued his flight training on 5 June 2013.

The Student recommenced flight training with the ATO on 6 July 2020. Training records show that the he had completed three hours of circuit practice (including a solo flight) in Phase 1 of training between 12 July and 17 July 2020, and three hours of consolidation practice flying circuits in Phase 2 at EIAB between 24 August and 26 August 2020.

Following three hours of other dual exercises (advanced turning, engine failure and precautionary landing practice) an additional one hour of solo flight was recorded involving departure and re-join procedures to the airfield. This flight was recorded as having taken place on 10 September 2020.

A dual instruction flight on the Cessna 172 type was logged on 16 July 2020, with a solo check out. On 25 September 2020, the day prior to the accident, the Student also carried out a dual instruction general handling exercise in the training area, and carried out three take-offs and landings under instruction.

Since recommencing his training in 2020, the Student logged the following flight experience (**Table No. 1**), with dual Instruction (Pilot under training) shown as 'P.u/t' and solo flight (Pilot-in-Command) shown as 'P.1':

Students recent flying (2020)	P.u/t	P.1	Total (type)
	(Hrs.min)		
Cessna 150, 152	15.15	4.00	19.15
Cessna 172	1.50	1.15	3.05
Total (dual/solo)	17.05	5.15	22.20

Table No. 1: Students recent flying (July to September 2020)

The debrief notes in the Student's training records show that the Student demonstrated a good standard of flying ability and consistently achieved good assessments. The records also show that he flew with a number of instructors between July 2020 and the accident date in September 2020, with the majority of his training being carried out by two individual instructors.

1.8 Damage to Runway

The runway surface (on RWY 28) was inspected by the AAIU following the accident. No evidence of the initial touchdown point was apparent. A total of 17 witness marks consistent with a propeller strike were noted 5.2 m to the left of the runway centreline. The marks were new with no debris or dirt present. The marks began at a distance of 55 m along RWY 28 from abeam the western edge of Taxiway A North and continued for 94 m to just beyond Taxiway C South, where the aircraft came to a stop. Hydraulic fluid was also noted on the runway surface close to where the aircraft came to a stop (**Photo No. 3**).

Photo No. 3: Propeller marks in paved surface where aircraft came to a stop

1.9 Airfield Information

EIAB is a private licenced airfield at an elevation of 195 ft AMSL[5] situated 12 Nautical Miles (NM) northwest of Mullingar in Class G (uncontrolled) airspace. It has a single paved runway designated 10-28. AIP Ireland[6] showed a landing distance available (LDA) on RWY 28 of 750 m with a runway width of 16 m.

The runway has two associated taxiways; TWY A North with access to the north parking area and ATO facility, and TWY C South providing access to the south area apron and its hangars (**Appendix A**).

[5] **AMSL**: Above Mean Sea Level.
[6] **AIP Ireland**: Aeronautical Information Publication, part of the Aeronautical Information Package, published by the IAA.

1.10 Actions Implemented by the ATO

In a communication dated 6 November 2020, the ATO advised the Investigation that revised stabilised approach and recency requirements were being put in place subsequent to the accident by way of the following Flight Crew Instructions (FCIs): *'Defined stabilised approach criteria are to be established for each aircraft type. These criteria are to be included in the instructor standardisation and on flight training syllabi'* and, *'Defined experience and recency requirement for solo flight in specific aircraft types'*.

The ATO subsequently issued two Flight Crew Instructions (FCI): FCI 06-20 was issued on 2 December 2020 regarding Stabilised Approaches and FCI 01-21 issued on 21 January 2021 regarding Student Solo Flight.

The ATO also notified the Investigation that, in addition to the above FCIs being issued, it's Ops Manual Part A, Flight Training Manuals, Student Handbook and Instructor Guide would be amended as appropriate.

2. ANALYSIS

2.1 General

The debrief notes in the Student's training records show that he demonstrated a good standard of flying ability with good assessments. The Student acknowledges that as the aircraft was high on the approach, he should have discontinued his approach and carried out a go-around.

2.2 Judgement and Decision Making

Circuit training serves largely for a student to become proficient at landing and take-off in various conditions. The standard circuit pattern and power settings used help a student to become proficient in flying the aircraft to the correct position and height for turning onto final approach with little further adjustment normally required on final approach.

Conversely, returning to the airfield from the training area and joining an approach may typically involve a descent to join the circuit, or may involve joining a 'straight-in' approach. Descent and positioning of the aircraft, configuration and speed changes while monitoring airspeed, involves continuous careful judgement and assessment on the part of the Student. In this case, assessing the height of the aircraft as the circuit or final was joined was likely to have been a more demanding task for the Student.

During dual training, an instructor must observe a student making value judgements and prudent decisions regarding an aircraft's flight path. This is particularly important during the approach and landing phase and an instructor must be satisfied that a student has the ability to recognise when they have mis-judged an approach or landing for any reason and that appropriate corrective action is taken by a student to ensure safety.

2.3 Actions Implemented by the ATO

The Investigation acknowledges the actions proposed and implemented by the ATO. The Investigation is of the opinion that while such measures may be judged by the ATO to be sufficient at this time, it should not prevent the ATO from taking any further action it deems may be warranted. Accordingly, the Investigation does not make any Safety Recommendations.

3. CONCLUSIONS

3.1 Findings

1. The aircraft was properly maintained and airworthy.
2. The Pilot held a valid Class 2 Medical certificate.
3. Training records show that the Student demonstrated a good standard of flying ability and consistently achieved good assessments.
4. The approach was high and fast resulting in a bounced landing.
5. The landing was continued, resulting in nose-down impact with the runway.
6. At no point was a decision made to discontinue the approach.
7. An attempt was made to taxi the aircraft after it had come to a stop.
8. ATO procedures for the approval of student solo flight were revised.

3.2 Probable Cause

A high and fast approach, resulting in a bounced landing, followed by a nose-down impact with the runway.

3.3 Contributory Cause

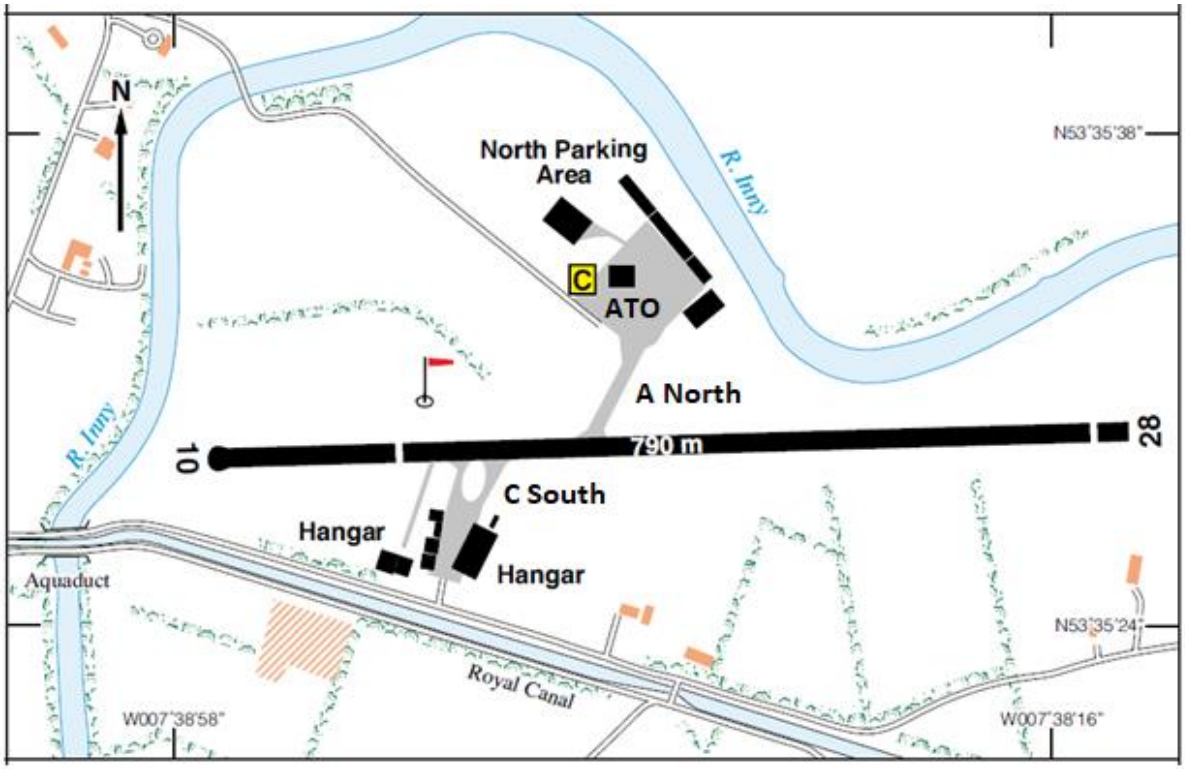
Decision to continue with a landing from a high and fast approach.

4. SAFETY RECOMMENDATIONS

This Investigation does not sustain any Safety Recommendations.

Appendix A

EIAB Airfield Information



Abbeyshrule Airfield (EIAB) Layout (*Pooleys*)

- 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

An Roinn Iompair
Department of Transport

Air Accident Investigation Unit,
Department of Transport,
2nd Floor, Leeson Lane,
Dublin 2, D02 TR60, Ireland.
Telephone: +353 1 604 1293 (24x7): or
+353 1 241 1777 (24x7):
Fax: +353 1 604 1514
Email: info@aaiu.ie
Web: www.aaiu.ie
Twitter: @AAIU_Ireland