Air Accident Investigation Unit Ireland

SYNOPTIC REPORT

ACCIDENT
Cessna FA152, EI-EDC
Adamstown Airfield, Co. Meath

31 March 2017

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.

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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.

AAIU Report No: 2017-010
State File No: IRL00917021
Report Format: Synoptic Report
Published: 25 September 2017

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 31 March 2017, appointed Mr Howard Hughes as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	Cessna FA152, EI-EDC
Number and Type of Engines:	1 x Lycoming O-235-L2C
Aircraft Serial Number:	376
Year of Manufacture:	1981
Date / Time (UTC):[4]	31 March 2017 @ 11.30 hrs UTC[4]
Location:	Adamstown Airfield, Co. Meath
Type of Operation:	General Aviation - Flight Training/Solo
Persons on Board:	Crew - 1 Passengers - Nil
Injuries:	Crew - Minor
Nature of Damage:	Substantial
Commander's Licence:	N/A (Student Pilot flying under instructor authorisation)
Commander's Age:	48 years
Commander's Flying Experience:	70 hours, of which all were on type
Notification Source:	Operator
Information Source:	AAIU Report Form submitted by Pilot AAIU Field Investigation

[4] **UTC**: Co-ordinated Universal Time. All times in this report are UTC (UTC plus one hour equals Local Time).

SYNOPSIS

The aircraft departed Weston Airport (EIWT) with the intention of carrying out a solo navigation exercise under Visual Flight Rules (VFR) to Kinnegad, Co Meath, returning to EIWT. Shortly after passing close to the town of Enfield the Student Pilot noted a band of cloud and rain to the south of their position. In order to remain in Visual Meteorological Conditions (VMC), the Pilot elected to divert to Trim Airfield (EITM). Having located what was thought to be EITM, and with poor weather closing in, the Pilot attempted a landing. The aircraft touched down on an area of tilled soil to the south of the prepared grass runway. The aircraft also '*landed long*', in that it did not touch down at the beginning of the chosen landing area, and due to the soft soil, when the brakes were applied, it pitched tail over nose and came to rest inverted. The Pilot sustained minor injuries.

1. FACTUAL INFORMATION

1.1 History of Flight

The Student Pilot was undergoing flight training with an Approved Training Organisation (ATO), in preparation for a PPL(A)[5] evaluation. The aircraft was owned and operated by the ATO.

The Pilot planned to carry out a short solo navigation flight from EIWT, to overhead the town of Kinnegad, Co. Meath, and return to EIWT. The Pilot had fuelled the aircraft such that the fuel tanks were full, which was in excess of the fuel required for the intended flight, including diversion and contingency fuel. Prior to departure the Pilot self-briefed from the latest weather information provided by the ATO, prepared and filed a flight plan for the intended flight, and with her planning documentation appraised by the Duty Instructor, was approved and signed out for the flight.

The aircraft was started, taxied to the departure runway at EIWT, and took off from Runway (RWY) 26 at 10.40 hrs. The take-off, climb-out and initial portion of the flight proceeded without incident. At 10.44 hrs the flight was transferred from Weston Air Traffic Control (ATC) to the Dublin ATC Flight Information Service (FIS), at which point the Pilot informed Dublin FIS that she was east of Kilcock with the intention of routing to Kinnegad before returning to EIWT. However, after passing the town of Enfield, the Pilot became aware of '*a wall of cloud and rain*' to the south of her track. The Pilot then commenced a 180 degree turn back towards EIWT.

The Pilot told the Investigation that, having turned the aircraft, she realised her intended course back to EIWT would take her into the weather she had seen, which was now obscuring her view of Kilcock. As she was not rated for flight in Instrument Meteorological Conditions (IMC), the Pilot elected to divert to EITM, where she could land and wait for the rain and low cloud to pass. The Pilot set course for EITM and at 11.13 hrs she informed Dublin FIS of her intentions. Dublin FIS asked the Pilot if she wished to close her flight plan[6], which the Pilot stated she did. The aircraft was 2 nautical miles south of EITM at this time.

[5] **PPL(A)**: Private Pilot Licence (Aeroplane).
[6] **Flight Plan Closure**: The act of informing ATC that you no longer are operating on the active flight plan as submitted (usually associated with arrival at destination or alternate airport/airfield).

The Pilot told the Investigation that, although she had never landed there before, she knew the general location of EITM. She could not immediately make visual contact with the airfield and commenced a series of orbits over the general area of Trim to try and locate EITM. Following a third such orbit the Pilot noticed a wind-sock and grass strip. She noted that the runway direction was westerly and appeared long enough to land a Cessna 152 aircraft, and assumed that this was EITM. With the band of cloud and rain now approaching, the Pilot elected to land at this airfield. The airfield she in fact selected was Adamstown.

The Pilot descended to 1,000 ft and established on a left downwind for the westerly runway. The Pilot told the Investigation that due to the approaching weather, she flew close to the airfield in order not to lose sight of it. However, due to a significant wind from the south west, the aircraft was blown through the centreline during the first two attempts to establish on final approach, and in each case a go-round was performed. On the third attempt the Pilot widened out the circuit, by positioning the aircraft further south of the runway on the downwind leg. The Pilot noted that the rain and low cloud was now very close to the field and that there was precipitation on the windscreen of the aircraft during the final circuit, which caused her some unease.

The Pilot was also concerned with the proximity of buildings to the threshold of the runway, the closest of which lay approximately 12 metres (m) to the north of the runway centreline. To avoid coming too close to the buildings, the Pilot flew the final approach slightly south of the runway centreline, with the intention of turning back onto the runway once past them. However, on short finals the Pilot began to experience turbulence due to the blustery wind conditions associated with the approaching showers. As a result the Pilot elected to land straight ahead on the agricultural field.

However, the aircraft did not touch down until approximately three quarters of the way into the field, see **Figure No. 1**. The Pilot told the Investigation that although the touchdown was deep into the field, she felt that a further go-round and circuit was not an option as the rain shower was now virtually overhead the field.

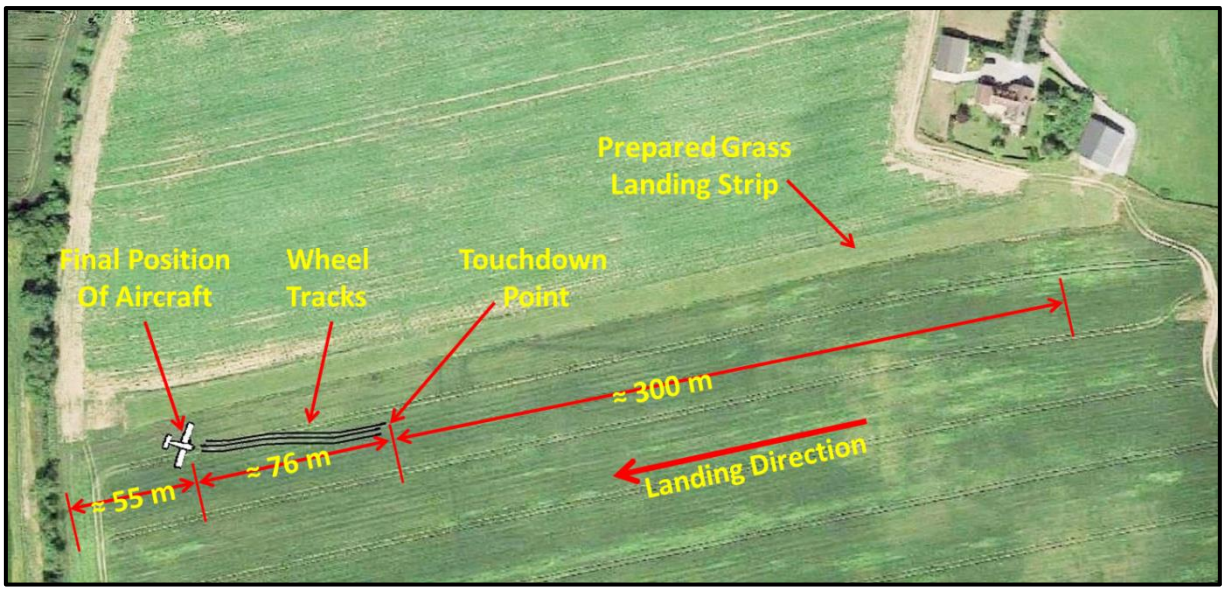

Figure No. 1: Location of aircraft and touchdown witness marks.

Upon touchdown, the Pilot became concerned that the aircraft would impact with the hedge and raised bank at the end of the field, and applied brakes. This resulted in the aircraft nose wheel digging into the soft tilled soil, which contained a recently sown cereal crop. The soil was broken, loose and damp, and the aircraft overturned nose first and came to rest inverted, on a magnetic heading of approximately 120^{o} (**Photo No. 1**).

Photo No. 1: Final resting position of EI-EDC, south of RWY 26

While the aircraft sustained substantial damage, the Pilot evacuated the aircraft unaided via the left cockpit door. The accident occurred at approximately 11.30 hrs.

1.2 Interviews

1.2.1 Student Pilot

The Student Pilot was interviewed at the accident site by the Investigation, and subsequent interviews were conducted by phone.

The Pilot informed the Investigation that she had self-briefed from the meteorological charts and tabulated weather provided to pilots by the ATO. The weather briefing was available in paper and electronic formats. The Pilot provided the Investigation with copies of the meteorological briefing sheets she had used to plan her flight. The Pilot said that she was *"aware from the charts of frontal weather forecast to move through the area later that afternoon, and that the weather I saw, I assumed was that front approaching sooner than forecast"*.

The Pilot told the Investigation that her only experience of landing on a grass strip was twice; once with an instructor at EIWT, and again with an instructor on a flight to Ballyboy Airfield. Most of her experience of approach and landing was carried out at EIWT, which has a 924 m Tarmac runway with 475 m of Tarmac stopway. The Pilot said she had flown to EITM before, but only to overfly as part of a navigation exercise, and not to land.

Other airports/airfields that the Pilot had landed at included:

- Abbeyshrule – 790 m, asphalt
- Sligo – 1200 m, asphalt
- Ballyboy – 600 m, grass

1.2.2 Witness

Another pilot, who was an instructor with the ATO, took off just before the accident flight. The Investigation interviewed this pilot to get an opinion on the weather conditions in the area.

This instructor was teaching another student, and he noted that the meteorological conditions were benign when he took off. He informed the Investigation that as he was returning to EIWT they encountered what he described as *'quite heavy showers with a low cloudbase'*, which had moved from south of EIWT over the area of the Airport, and over the Kilcock area. He told the Investigation that due to the weather, he took control of the aircraft and flew back to EIWT, as he felt the conditions were *'somewhat challenging'* for the student to continue.

1.3 Injuries

Although the Pilot reported that she was uninjured following the accident, she was later diagnosed with a minor soft tissue injury to the right shoulder. As the aircraft had come to rest inverted the Pilot believed that this injury occurred upon releasing the harness.

1.4 Damage to Aircraft

Initial inspection of the aircraft at the scene showed that the propeller had contacted the ground whilst under low power, resulting in damage to the propeller and therefore possible shock-load damage to the engine. There was substantial damage to both wings and the main spar. The rudder and tail fin along with the upper fuselage skin were also damaged; see **Photo Nos. 2 and 3.**

Photo No. 2: Port wing

Photo No. 3: Starboard wing

A full damage report was provided to the Investigation by the Operator. Following a review of the damage sustained, the Operator stated that it was their intention to have the aircraft repaired.

1.5 Other Damage

There was localised damage to the crop in the field due to tyre rutting on landing and where the aircraft came to rest. There was also associated damage to the crop during aircraft recovery and removal.

1.6 Personnel Information

The Pilot was flying as a Student Pilot. The Irish Aviation Authority (IAA) informed the Investigation that as such, the Pilot did not require a Pilot Licence, as they would be released to fly under the authorisation of an instructor of the ATO. The IAA informed the Investigation that the Pilot would require a Medical Certificate. The Pilot held a valid Class 2 medical certificate issued by the IAA, which was valid until 14 August 2017. All of the Pilot's flying experience was obtained on Cessna 152 aircraft with the ATO. The Pilot's total flight experience is set out in the **Table No. 1**.

Total all types:	70.5 hours
Total all types P1:	10.5 Hours
Total on type:	70.5 hours
Last 90 days:	10.2 hours
Last 28 days:	4.0 hours
Last 24 hours:	0.2 hours

Table No. 1: Pilot's Flying Experience

1.7 Aircraft Information

1.7.1 General

The Cessna 152 is a high-wing aircraft, equipped with a fixed tricycle landing gear, and is powered by a single reciprocating engine. The fuselage and empennage are of an all-metal semi-monocoque design, with the wings externally braced. The aircraft is equipped with two side-by-side cockpit seats, both of which were fitted with a four-point harness. The accident aircraft had a certified maximum take-off weight of 758 kg.

1.7.2 Certification

The aircraft was correctly certified and was operating on a valid Airworthiness Review Certificate (ARC).

1.8 The Operator

The Operator is an ATO based at EIWT. The Duty Instructor on the day of the accident was interviewed by the Investigation. He told the Investigation that the Pilot had briefed him on the route and weather conditions for the proposed navigation exercise. The Duty Instructor was satisfied that the weather expected over the time period of the navigation exercise was within prescribed limits used by the ATO for release of solo students.

The Duty Instructor also confirmed that students were instructed to append the word 'Student' to their callsign upon first radio contact with an ATC unit. The word 'Student' was also to be included in the details submitted as part of any ATC flight plan filed. The Investigation confirmed that the Student Pilot followed this procedure on the day of the accident flight.

1.9 Meteorological Information

The Aviation Services Division of Met Éireann, the Irish Meteorological Service, provided the Investigation with an aftercast for the Trim area for the time of the event which is reproduced in **Table No. 2**.

Meteorological Situation:	A low pressure system was centred directly west of Ireland (at approx. 15W) with an occluded front/trough moving in a SW flow through SW Leinster. The vertical temperature profile was unstable in the lowest layers of the atmosphere with only shallow convection likely in the Trim area.	
Wind:	**Surface:**	19010-15 KT with a possibility of local gusts to 20-25 KT (Dublin Airport gusted 25 KT at 1100 UTC)
	2000 ft	21020-25 KT
Visibility:	20-25 km	
Weather:	Nil apart from the possibility of some local light showers.	
Cloud:	SCT2000FT BKN2500-3000FT OCNL BKN2000FT	
Surface Temp/Dew Pt:	Circa 12/7 deg. Celsius	
MSL Pressure:	1001 hPa	
Freezing Level:	5500 ft	
Other Comments:	RADAR and satellite do not suggest Cb[7] activity at the location co-ordinates at the time of the incident	

Table No. 2: Met Éireann Aftercast

From **Table No. 2** it can be seen that there was a possibility of showers developing in the area, although not of a deep convective type such as Cb.

[7] **Cb**: Cumulonimbus cloud. A heavy and dense cloud of considerable vertical extent in the form of a mountain or huge tower, often associated with heavy precipitation, lightning and thunder

1.10 Airfield Information

Adamstown Airfield, where the accident occurred, is a private airfield consisting of one grass runway oriented 08/26. The runway is approximately 400 m long and was bounded to the north and south by an agricultural field, which was planted with a cereal crop. Access to the runway is via the threshold of RWY 26, where a widening of the prepared grass strip leads to a small hangar.

1.11 Additional Information

1.11.1 VMC Requirements

Since 4 December 2014, in line with all other EU Member States, Ireland has introduced the Single European Rules of the Air (SERA) legislation (EC 923/2012), within which, *Rules of the Air, Section 5,* outlines the visual meteorological conditions and visual flight rules.

On the day, EI-EDC was operating in Class G airspace, below 3,000 ft, and more than 1,000 ft above terrain. Therefore the minimum visibility and clearance from cloud, stated in *SERA.5001 VMC visibility and distance from cloud minima,* were applicable. The minima are set out in Table $5-1 of SERA.5001, the relevant section of which is shown in **Table No. 3** below.

Altitude band	Airspace class	Flight visibility	Distance from cloud
At and below 900 m (3000 ft) AMSL, or 300 m (1000 ft) above terrain, whichever is the higher	F G	5 km [8]	Clear of cloud and with the surface in sight

Table No. 3: Extract from Table $5-1, SERA.5001

1.11.2 VFR Flight into IMC Conditions

The AAIU, along with other Safety Investigation Authorities, has reported on a number of accidents and incidents which have involved flight from VFR into IMC conditions, sometimes with fatal consequences; some examples of which are:

- JetRanger II, Lispole Dingle Kerry, 28 Aug 2002
  AAIU Report No: 2003-016
- Robinson R44, Near Derrybrien, Co Galway,09 Jul 2005
  AAIU Report No: 2006-019
- Avions Robin Jodel DR 250-160, Oranmore Galway, 19 Sep 2005
  AAIU Report No: 2006-023
- Beech 65-A90 King Air, Ireland West Airport Knock, 22 August 2006
  AAIU Report No: 2007-010

[8] When so prescribed by the competent authority: flight visibilities reduced to not less than 1,500 m may be permitted for flights operating at speeds of 140 kts IAS or less to give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

An Australian Air Transport Safety Board (ATSB) study *'An overview of spatial disorientation as a factor in aviation accidents and incidents'* notes the following:

> *Visual flight rules flight into IMC represents a significant cause of aircraft accidents and fatalities. A US study showed that in the years 1975 to 1986, VFR flights into IMC accidents were associated with a fatal outcome in 72 per cent of cases, compared with an overall general aviation fatality rate of 17 per cent (NTSB, 1989). Thus, there was a four times greater chance of fatality in a VFR flight into IMC accident than any other sort of accident (Batt & O'Hare, 2005; NTSB, 1989). A study in Canada produced a similar result: a 50 per cent VFR flight into IMC fatality rate compared with 13 per cent for all other accident types, in the period 1976 to 1985 (Transportation Safety Board of Canada, 1990). In the year 2001, the VFR flight into IMC fatality rate in the US was 84 per cent (Frederick, 2002).*
>
> *An Australian study found remarkably similar results: 75.6 per cent of VFR flights into IMC accidents resulted in fatalities (Batt & O'Hare, 2005).*

European General Aviation Safety Team[9] (EGAST) published Leaflet G8 titled '*STALL AND SPIN LOSS OF CONTROL'* in which it stated *inter alia*:

> *If a pilot loses visual references and has no suitable instruments and qualifications, or has not been trained to use the ones he has, the pilot is unlikely to be able to stay within the flight envelope, which may result in stalling or spinning. Beware of clouds, fog, snow, or heavy rain showers! Turn around and divert while you are still able to keep visual references.*

2. ANALYSIS

This accident occurred following a precautionary diversion by a Student Pilot due to an unexpected deterioration in the weather conditions. The Investigation is satisfied that the forecast weather conditions prior to departure were within limits established by the ATO for the proposed flight to commence and that the Pilot had briefed herself and the Duty Instructor of the ATO appropriately. An instructor from the ATO who took off from EIWT shortly before the Student Pilot confirmed that conditions were initially benign.

Aftercast details provided by Met Éireann showed that the vertical temperature profile was unstable in the lowest layers of the atmosphere with only shallow convection likely in the Trim area, and the possibility of light showers. The instructor who was airborne at the same time confirmed that a band of showers and low cloud moved from south of EIWT over the area of the Airport, and over the Kilcock area, and that conditions were challenging for the pilot he was instructing.

[9] The European General Aviation Safety Team (EGAST) is a voluntary safety partnership between General Aviation associations, industry, EASA and other authorities from across Europe. For more information follow this link: https://essi.easa.europa.eu/egast.1.html

Over the years aviation Safety Investigation Authorities, including the AAIU, have reported on accidents involving inadvertent flight into IMC, often with fatal consequences. Therefore the Investigation is of the opinion that, faced with the approaching weather, the Student Pilot acted appropriately by diverting away from rain and low cloud in an attempt to locate EITM.

However, the Investigation notes that the Pilot had only flown to EITM once before and in that event it was to overfly the airfield as part of a navigation exercise. So whilst the Pilot was aware of the general location of EITM, she was not familiar enough with the airfield to locate it on this occasion, especially when under pressure to land due to approaching weather. Having performed a number of orbits in an attempt to locate EITM, it is understandable, once a windsock and grass landing strip were observed by the Pilot, she made the assumption that what she saw was EITM.

On this occasion the Pilot had located a private airfield at Adamstown, and with the weather now quite close, she elected to land there. The Investigation is of the opinion that the Pilot's unfamiliarity with EITM contributed to her attempt to land on a shorter grass strip.

The Investigation therefore makes the following Safety Recommendation to the ATO.

Safety Recommendation No. 1

The National Flight Centre should review its training syllabus to consider including diversion exercises, to alternate airfields in the vicinity of EIWT (**IRLD2017011**).

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Due to the challenging conditions on approach, the first two attempts to land were unsuccessful. Under pressure to land the aircraft before the weather arrived overhead the airfield, the Pilot made a third attempt, which resulted in a long landing, onto soft tilled soil beside the prepared grass landing strip. Upon brake application, the nose wheel dug into the soft earth and the aircraft overturned, sustaining substantial damage.

The Pilot had very little experience landing on grass runways with dimensions similar to those of Adamstown. This, and the Pilot's concern over the buildings close to the touchdown area of the runway, contributed to her attempting a landing on the agricultural area to the south of the grass runway without sufficient stopping distance.

The aircraft was fitted with a four-point harness. The Investigation is of the opinion that this prevented serious injury being sustained by the Pilot.

3. CONCLUSIONS

3.1 Findings

1. The Student Pilot was in possession of a valid Class 2 Medical Certificate.
2. The aircraft was operating on a valid ARC.
3. The Student Pilot was carrying out a solo navigation exercise under the approval of an authorised Flight Instructor.
4. During the outbound leg of the flight the Pilot noted a band of showers and rain to the south of the aircraft, moving towards her position, and elected to divert to EITM.
5. The Pilot mistook Adamstown airfield located to the south east of Trim, for EITM.
6. The Pilot found the conditions challenging and made three attempts to land the aircraft, the third of which resulted in a landing that was long and on soft agricultural ground, adjacent to the prepared landing strip.
7. During brake application the nose wheel dug into the soft earth and the aircraft overturned, resulting in substantial damage.
8. The Pilot sustained minor injuries as she exited the aircraft.

3.2 Probable Cause

Landing on an area of tilled agricultural soil without a sufficient landing run available.

3.3 Contributory Cause(s)

1. Brake application causing the nose wheel to dig into soft ground.
2. Unfamiliarity with potential diversionary airfields.

4. SAFETY RECOMMENDATIONS

	It is Recommended that:	Recommendation Ref.
1.	The National Flight Centre should consider reviewing its training syllabus to include diversion exercises, to airfields in the vicinity of EIWT	IRLD2017011

View Safety Recommendations for Report 2017-010

- 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

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