



Air Accident Investigation Unit Ireland

FACTUAL REPORT

SERIOUS INCIDENT

**Airbus Helicopters, AS 355 F2, G-PDGT
Ireland West Airport**

15 January 2025



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 13¹ to the Convention on International Civil Aviation, Regulation (EU) No 996/2010² and Statutory Instrument No. 460 of 2009³, safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation 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.



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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, on 16 January 2025 the Chief Inspector of Air Accidents appointed Ray Jordan as the Investigator-in-Charge to carry out an Investigation into this Serious Incident and prepare a Report.

Aircraft Type and Registration:	Airbus Helicopters AS 355 F2 , G-PDGT	
No. and Type of Engines:	2 x Allison 250-C20F Turboshaft	
Aircraft Serial Number:	5374	
Year of Manufacture:	1988	
Date and Time (UTC)⁴:	15 January 2025 @ 10:53 hrs	
Location:	Ireland West Airport, Co. Mayo, Ireland	
Type of Operation:	Aerial Work	
Persons on Board:	Crew – 1	Passengers – Nil
Injuries:	Nil	
Nature of Damage:	Minor	
Commander's Licence:	Commercial Pilot Licence (CPL) Helicopter (H), issued by the Civil Aviation Authority (CAA) of the United Kingdom	
Commander's Age:	51 years	
Commander's Flying Experience:	2,718 hours, of which 1,055 were on type	
Notification Source:	The Operator	
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 the same as UTC on the date of the occurrence.

SYNOPSIS

Following a flight from its base in Scotland, the Helicopter, an AS 355 F2, with one Pilot on board, conducted an approach to Runway 26 at Ireland West Airport (EIKN). As the Helicopter manoeuvred at a low height towards Taxiway A, the Pilot felt a momentary '*kick of yaw*' but retained full control of the Helicopter and subsequently landed at the allocated stand. After engine shutdown, the Pilot observed that a section of the tail rotor driveshaft fairing was missing and was later found on the runway. The fairing caused damage to the tail rotor driveshaft and tail rotor blades as it departed the Helicopter. No injuries were reported to the Investigation and there was no fire.

NOTIFICATION AND RESPONSE

The Operator contacted the AAIU following the occurrence. Two Inspectors of Air Accidents deployed to EIKN and commenced an Investigation.

1. FACTUAL INFORMATION

1.1 History of the Flight

The Helicopter, an Airbus Helicopters AS 355 F2, departed Cumbernauld Airport (EGPG) in Scotland at approximately 08:41 hrs on a positioning flight to EIKN in the west of Ireland. The Pilot said that the enroute weather was good and the Helicopter's cruising altitude varied between 1,500 and 2,000 feet (ft), due to some headwind encountered during the flight. As the Helicopter approached the EIKN Control Zone boundary, the Pilot contacted the Tower Controller, who instructed him to call when visual with the Airport. This was acknowledged by the Pilot who subsequently called '*field in sight*'. The Helicopter was cleared for a visual approach to Runway (RWY) 26 and was then cleared to land. The reported wind at the time was from 190 degrees at 10 knots. The Helicopter descended to a height of approximately 10-15 ft and hover-taxied⁵ above the runway. The Pilot stated that as he manoeuvred the Helicopter at a low height towards Taxiway (TWY) A (**Figure No. 1**), he felt a '*kick of yaw*'.



Figure No. 1: Approximate track of G-PDGT along the runway, TWY A and Apron
(Google Earth)

⁵ **Hover-taxi:** Movement of a helicopter above the surface of an aerodrome, normally in ground effect (i.e. within 1.5 rotor diameter lengths of the surface) and at a ground speed usually less than 20 kt.



The Pilot, who was seated in the right-hand seat, said that he ‘pedal turned⁶’ the Helicopter through 90 degrees whilst in the hover on TWY A to assess the situation and he then advised the Tower Controller that ‘something has come off the aircraft [...] or it was a bit of FOD⁷’. The Tower Controller cleared the Helicopter to Stand 1 and instructed a rescue vehicle to conduct a runway inspection due to an inbound passenger aircraft. The rescue vehicle retrieved a damaged fairing from the touchdown zone of the runway and called clear of RWY 26 when the inspection was completed. The Pilot exited the Helicopter following engine shutdown and observed an exposed section of the tail rotor driveshaft (**Photo No. 1**). The Tower Controller subsequently gave landing clearance to the inbound aircraft when it was approximately 2.5 nautical miles from the runway threshold.



Photo No. 1: Exposed section of tail rotor driveshaft

1.2 Injuries to Persons

No injuries were notified to the Investigation.

1.3 Closed Circuit Television (CCTV) recording from EIKN

The Airport Operator provided the Investigation with CCTV footage of the Helicopter’s approach and hover-taxi over the runway and TWY A. The CCTV camera was positioned beyond the end of RWY 26; due to the distance involved, it was not possible to see the fairing as it departed from the Helicopter in flight. The Helicopter (ringed in yellow) prior to its 90 degree turn (pedal turn) to the right over TWY A is shown in **Photo No. 2**.



Photo No. 2: The Helicopter prior to its 90 degree turn to the right

⁶ **Pedal Turn:** Hovering turns are commonly referred to as pedal turns.

⁷ **FOD:** Foreign Object Debris includes any object found in an inappropriate location at an airfield that, as a result of being in that location, can damage equipment or injure personnel. Runway FOD has the greatest potential of causing damage.

1.4 Damage to Helicopter

The tail rotor drive shaft sustained circumferential damage, with scoring observed at two locations (**Figure No. 2**). Area 'A' on the aft portion of the shaft, was approximately 18 millimetres (mm) in length and 0.35 mm deep; area 'B' was approximately 68 mm in length and 0.31 mm deep.

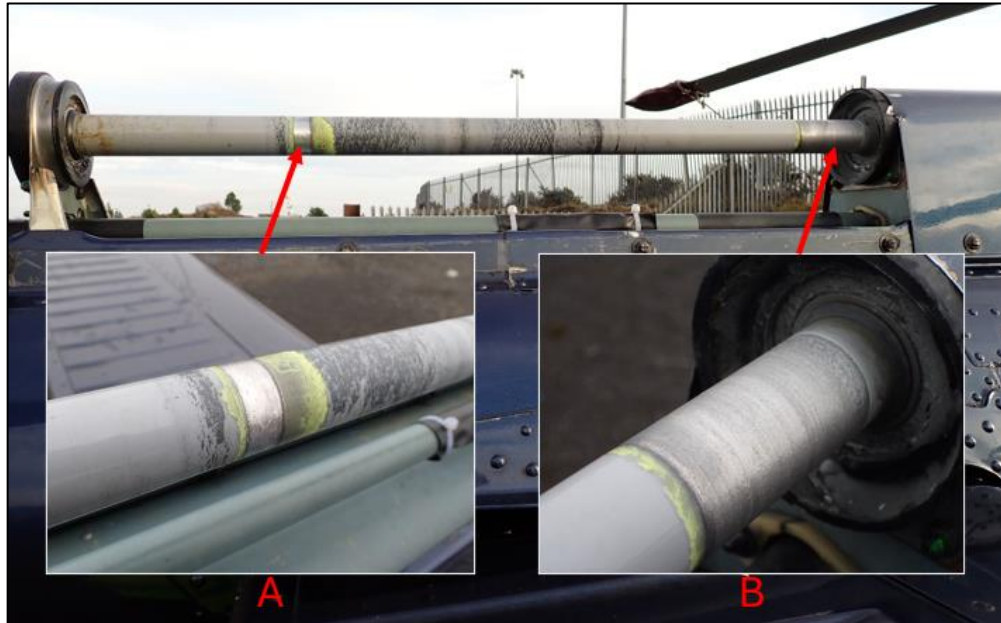


Figure No. 2: Damage to tail rotor driveshaft

Following separation of the fairing, six of its captive fasteners were found secured to the right-hand side of the tail boom (**Figure No. 3**).

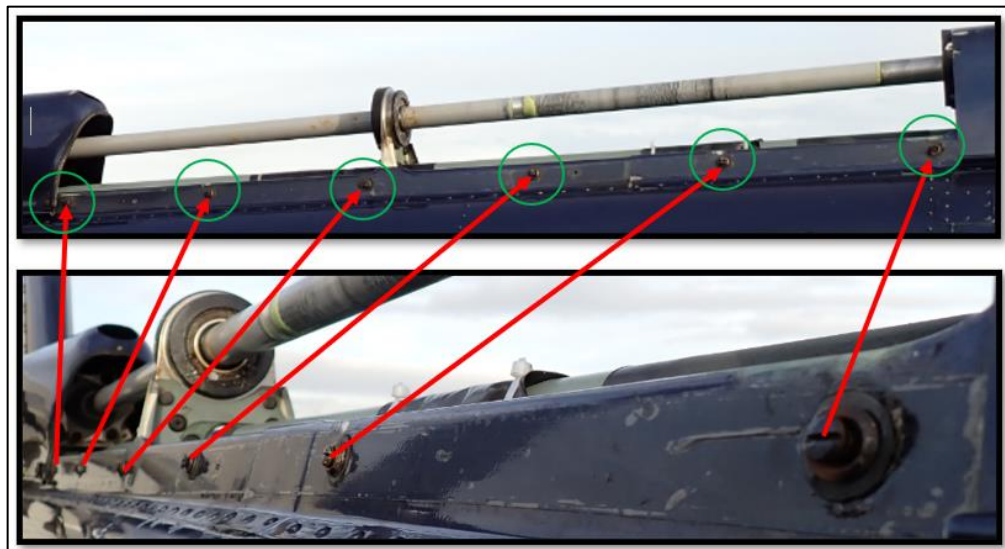


Figure No. 3: Fasteners in place on airframe

Of the six fasteners on the left-hand side, two remained attached to the fairing (**Photo No. 3**), four were missing, and during the runway inspection, only one was recovered.



Photo No. 3: Left-hand side view of damaged fairing

One of the fasteners that remained attached to the left-hand side of the fairing (first from the left) sustained damage from where it came into contact with the aft area of the tail rotor driveshaft (area 'A' in **Figure No. 1**). This damage is ringed in yellow in **Photo No. 4**. This photo also shows abrasion damage (outlined in red) consistent with the lip of the fairing contacting the rotating drive shaft.



Photo No. 4: Damage to fastener and lip of fairing

An area of damage on the right-hand side of the fairing is ringed in yellow in **Photo No. 5**. The pattern of this damage is consistent with the fairing coming into contact with the rotating tail rotor drive shaft. The tail rotor blades sustained several areas of damage due to contact with the fairing as it departed from the Helicopter in flight; however, both blades remained intact and attached to the hub.



Photo No. 5: Damage to fairing

1.5 Interview with the Pilot

The Pilot informed the Investigation that the purpose of the flight was to position the Helicopter to EIKN to conduct powerline inspections later that day with two observers on board.

The Pilot said that the Helicopter had been hangared overnight and was in the process of being moved to the apron as he arrived at Cumbernauld Airport (EGPG) for the flight. He further reported that a base engineer had completed an After Last Flight (ALF) inspection of the Helicopter and that he conducted his own Pre-flight check (PFC) prior to his departure for EIKN. He recalled that it was getting bright as he conducted the check using a torch, and that he did not observe any issues with the Helicopter.

The Pilot reported that his departure from EGPG was normal and that the flight to EIKN was uneventful until he commenced his turn onto TWY A. He stated that there was a single kick of yaw as he applied right pedal to make the turn towards the taxiway. He did not believe this to be an aerodynamic effect but rather that the Helicopter may have been struck by FOD due to the downwash from the main rotors. He stated that he conducted a 90-degree pedal-turn to the right in order to observe the area behind him and that he could see something on the runway. Having advised the Tower Controller of the potential for FOD on the runway, and with no further anomalies, the Pilot continued to his allocated stand and shutdown the engines. The Pilot said that having inspected the Helicopter, he took a series of photographs and advised the Operator of the damage he observed.



The Pilot informed the Investigation that the ALF inspection would not have required the removal of the tail rotor driveshaft fairing. The Pilot was of the opinion that a fastener may have come loose during the flight which led to the fairing departing the Helicopter as it manoeuvred towards the taxiway.

1.6 CCTV Recording From EGPG

The United Kingdom’s Air Accidents Investigation Branch (AAIB) provided the Investigation with a copy of CCTV footage from EGPG on the day of the occurrence. According to CCTV timestamps, the Helicopter was pulled out of the hangar at 07:36 hrs, and at 08:41 hrs, it lifted off from its stand where it had been parked into wind. It then commenced a right turn of approximately 90 degrees and hover-taxied towards the departure runway (**Photo No. 6**). The Helicopter then made a left turn over the runway, transitioned to forward flight and departed normally. When the Helicopter was close to the CCTV camera, it was possible to see the tail boom fairing in place; however, it was not possible to see if it was fully secure as the Helicopter became airborne.



Photo No. 6: G-PDGT hover taxiing towards the departure runway

1.7 Personnel Information

1.7.1 Pilot

The Pilot held a CPL (H) issued by the UK CAA, which contained a valid AS 355 Type Rating with an expiry date of 31 October 2025. The licence also contained a Flight Instructor Rating for helicopters which was valid until 28 February 2025. The Pilot’s Class 1 Medical Certificate was valid until 25 February 2025. The Pilot’s flying experience is outlined in **Table No. 1**.

Total all types:	2,718 hours
Total on type:	1,055 hours
Total on type P1:	1,048 hours
Last 90 days:	108 hours
Last 28 days:	15 hours
Last 24 hours:	2 Hours

Table No. 1: Pilot’s Flying Experience

1.8 Helicopter Information

1.8.1 General

The AS 355 F2 helicopter, popularly known as the Ecureuil II, is a twin-engine, six-seat helicopter with a maximum take-off weight of 2,540 kilogrammes. The main rotor diameter is 10.69 metres (m), the tail rotor diameter is 1.86 m, and the fuselage length is 10.93 m. Two Allison 250-C20F turboshaft engines are mounted at the top of the fuselage, to the rear of the main gear box.

The tail rotor is driven by a shaft that runs along the tail boom. It is covered by three removable fairings, which are manufactured from aluminium alloy and are secured to the tail boom by a total of 38 camlock type fasteners. The rear fairing is secured with 12 fasteners, six per side.

The subject Helicopter had a valid Certificate of Airworthiness, issued by the UK CAA on 26 March 2022 and an associated Airworthiness Review Certificate, which was valid until 24 November 2025. It had accumulated a total flying time of 19,797.2 hours since its manufacture in 1988.

1.8.2 Helicopter Torque Reaction

The main rotors on the AS 355 F2, when viewed from above, rotate in a clockwise direction. Torque reaction results in a tendency for the fuselage to turn in the opposite direction (i.e., yaw to the left). To counteract this tendency to yaw left, opposite right pedal (anti-torque pedal) is applied which alters the pitch of the tail rotor blades and increases the thrust produced by the tail rotor.

In addition to counteracting the torque of the main rotor, the tail rotor is used to control the heading of a helicopter when hovering or making hovering turns. To perform a hovering turn to the right, application of right pedal is required (increase in tail rotor thrust) and to perform a hovering turn to the left, application of left pedal is required (decrease in tail rotor thrust).

1.9 Meteorological Information

Met Éireann, the Irish meteorological service, provided an aftercast of the estimated weather conditions prevailing at EIKN on the day of the occurrence. The information in the aftercast reported a surface wind from the south-southwest of 10-13 kts with 25+ km visibility and a surface temperature of 6 degrees Celsius.

1.10 Operator's Report

1.10.1 Introduction

On 21 January 2025, the Helicopter was recovered by the Operator (to its UK base) using surface transport, for a detailed inspection by company engineers. Following this inspection, the Operator provided the Investigation with a detailed report of their analysis, findings and safety actions implemented. The following subsections are based on information from that report.



1.10.2 After Last Flight Inspection and Pre-Flight Check

The Operator stated that, as per its Approved Maintenance Program (AMP) for the subject helicopter type, an ALF Inspection is required to be carried out following the last flight of the day and certified by authorised staff (engineer or pilot) in the helicopter’s technical log book. The ALF is valid for up to 10 hours of helicopter operation or three calendar days if the helicopter does not fly, after which a further ALF is to be conducted and certified.

An ALF was conducted and certified on 10 January 2025. However, the Helicopter was not tasked until the occurrence flight on 15 January. As over three days had elapsed, a further ALF was conducted and certified prior to departure for EIKN. The Operator stated that the ALF is based on Airbus Helicopters (the Type Certificate holder) maintenance data and that the check is a visual and tactile inspection to be conducted without tools other than a torch (if necessary).

Notwithstanding the requirement to conduct an ALF inspection, the Operator requires all of its pilots to conduct a Pre-flight check prior to departure. The relevant station diagram for use during the Pre-flight check is reproduced in **Figure No. 4**. Items No. 22 and No. 29 at Station 3 and 4 respectively require that the tail boom and shaft/gearbox fairings be checked for condition and security.

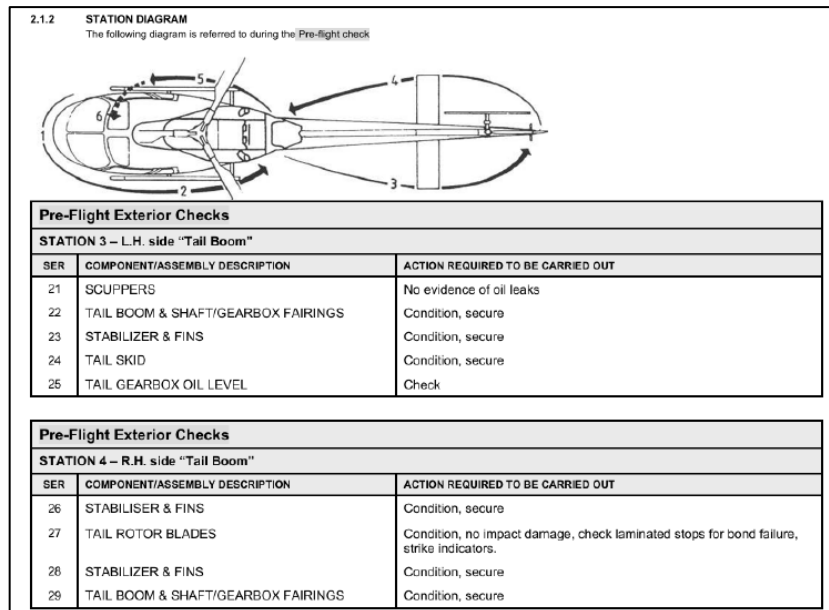


Figure No. 4: Pre-flight exterior checks

1.10.3 Maintenance History

The Operator stated that a 100/500-hour base maintenance inspection was conducted between 30 September 2024 and 5 October 2024 at 19,712.9 airframe hours. During this inspection, the tail rotor drive shaft was replaced with a new assembly, and a further base maintenance inspection was conducted between 31 October 2024 and 3 December 2024. This inspection required the removal and inspection of all fairings and cowlings and the removal of the tail rotor drive shaft. The tail rotor fairings were certified as being refitted on 2 December 2024 and an ALF inspection was certified on 3 December 2024.

The Operator reported that since 3 December 2024, when the tail rotor drive shaft fairings were last fitted to the helicopter, a total of 32 ALF inspections by six individuals was conducted with no issues identified. Additionally, the Helicopter flew 32 sectors during this period, each requiring a Pre-Flight check.

1.10.4 Tail Rotor Drive Shaft Fairing

The Operator found that the fasteners installed on the subject Helicopter's tail rotor drive shaft fairings were not fitted with the correct retaining washers and that the installed washers should only have been used in conjunction with the type of fastener that secures the tail rotor gear box fairing. The Operator stated that they acquired the subject helicopter in 2007 from the United States and believe that the incorrect washers had already been installed at the time of purchase. The Operator reported that although the fasteners on the front and centre fairings were installed using the incorrect retaining washers, the fairings remained secure and functioned in the correct manner when inspected.

The incorrect retaining washer as fitted to G-PDGT is shown in **Photo No. 7** and the correct fastener/split washer combination is shown in **Photo No. 8**. The retaining washers are designed to retain an open fastener in its fairing. It should be noted that the incorrect washers would not affect the correct functioning of the camlock fastener.



Photo No. 7: Incorrect combination



Photo No. 8: Correct combination

1.10.5 Operator Conclusion

The Operator opined that the rear fairing may have started to lift on the left-hand side either because one or more fasteners were not correctly secured prior to flight or failed during the flight. The Operator concluded that *'This may have happened before or during the flight and could be related to the incorrect Retaining Washer configuration'* and *'With these two Camlock Fasteners unsecured or missing, the airflow (including Main Rotor Downwash and Tail Rotor Thrust) has caused the panel to lift, vibrate and flap sufficient for the starboard forward edge to contact the TR [tail rotor] Driveshaft'*.

1.10.6 Safety Actions

As a result of the occurrence, the Operator conducted a fleetwide inspection of helicopters which had the same fairing installation as G-PDGT.



This revealed a further four helicopters with the incorrect fastener/washer configurations. The Operator implemented four safety actions which were:

1. A fleet check for the correct assembly, condition and functional check of the tail rotor and tail rotor gear box fairings.
2. Introduced a requirement to apply painted witness marks to these Cowlings and Fairings, that provides a visual aid as to the locking and security of the Camlock Fasteners for both Pilots and Engineers when conducting ALF and PFC inspections
3. The AMP was amended to include the requirement to physically check the security of Tail Rotor Cowlings and Fairings when conducting an ALF
4. Raised awareness of this incident and subsequent investigation via the Operator's Safety Management System

The Operator informed the Investigation that all of its affected helicopters, including G-PDGT, now have the correct fastener installation in accordance with the Helicopter Manufacturer's Illustrated Parts Catalogue (IPC).

2. **AAIU COMMENT**

The nature of damage to the detached fairing and the fact that fasteners were missing from the left-hand side indicates that the fairing began to lift on that side due to missing or unsecured fasteners. It then likely peeled back and made contact with the tail rotor drive shaft and tail rotor blades which were rotating at high speed, and tore away from the tail boom on the right-hand side, leaving the associated fasteners in place.

The Investigation notes that the separation occurred when the Helicopter was hover-taxiing at a low height and in a right turn, a manoeuvre that produces complex and dynamic airflow patterns around a helicopter from main rotor downwash and increased tail rotor thrust. It is possible that some fasteners on the left-hand side of the fairing were either unlocked, partially locked or missing at that stage in the flight. A similar turning manoeuvre was performed as the Helicopter lifted off from the apron at Cumbernauld. However, the fairing had remained attached. Nevertheless, it is possible that some fasteners were unlocked, partially locked or missing prior to departure from EGPG.

The Operator's report identified that an incorrect washer/fastener combination had been used to secure the three tail rotor drive shaft fairings on the subject helicopter. Following a fleet review, a further four helicopters were found to be affected by the same incorrect washer/fastener combination. It should be noted that the incorrect washers would not affect the functioning of the camlock fastener when correctly locked. However, it is essential that all components fitted to aircraft comply with the relevant technical publications.

The Operator introduced several Safety Actions to mitigate the possibility of such an event reoccurring, and it also replaced the fasteners on the affected helicopters in its fleet in accordance with the relevant IPC.

- 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

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