



FINAL REPORT

AIC 15- 2026

**PAPUA NEW GUINEA
ACCIDENT INVESTIGATION COMMISSION
SHORT SUMMARY REPORT**

HeviLift Ltd

P2-HCB

Bell 407

Engine power loss and forced landing

Tifalmin, West Sepik Province

PAPUA NEW GUINEA

22 July 2015

About the AIC

The Accident Investigation Commission (AIC) is an independent statutory agency within Papua New Guinea (PNG). The AIC is governed by a Commission and is entirely separate from the judiciary, transport regulators, policy makers and service providers. The AIC's function is to improve safety and public confidence in the aviation mode of transport through excellence in: independent investigation of aviation accidents and other safety occurrences within the aviation system; safety data recording and analysis; and fostering safety awareness, knowledge and action.

The AIC is responsible for investigating accidents and other transport safety matters involving civil aviation, in PNG, as well as participating in overseas investigations involving PNG registered aircraft. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The AIC performs its functions in accordance with the provisions of the PNG Civil Aviation Act 2000 (As Amended), Civil Aviation Rules 2004 (as amended), and the Commissions of Inquiry Act 1951 (as amended), and in accordance with Annex 13 to the Convention on International Civil Aviation.

The object of a safety investigation is to identify and reduce safety-related risk. AIC investigations determine and communicate the safety factors related to the transport safety matter being investigated.

Readers are advised that in accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of an AIC aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the prevention of accidents and incidents. (Reference: ICAO Annex 13, Chapter 3, paragraph 3.1.)

However, it is recognised that an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the AIC endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why it happened, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation.

At 03:35 UTC (1:35pm local time) on 22 July 2015, the AIC was notified by the PNG Air Services Limited of a serious incident involving a Bell 407 helicopter that forced landed at Tifalmin. The AIC confirmed the initial details with the aircraft operator, and classified it as a serious incident. Investigators arrived at the incident site at 02:20 UTC on 23 July 2015.

The AIC has produced a short summary report for greater industry awareness of potential safety issues and possible safety actions.

Engine power lost involving a Bell Helicopter 407, P2-HCB

Occurrence Details

On 22 July 2015, the pilot of a Bell 407 Helicopter, registered P2-HCB (HCB), owned and operated by Hevilift Limited, was scheduled for three charter flights from Tifalmin Camp to Olgal Camp, then to the Lam River, via Tifalmin for loading gravel. These flights were conducted under the Visual Flight Rules¹ (VFR) and there was no reported significant weather.

Google earth images modified by the PNG AIC



Fig 1: Area of the Accident.

Google earth images modified by the PNG AIC

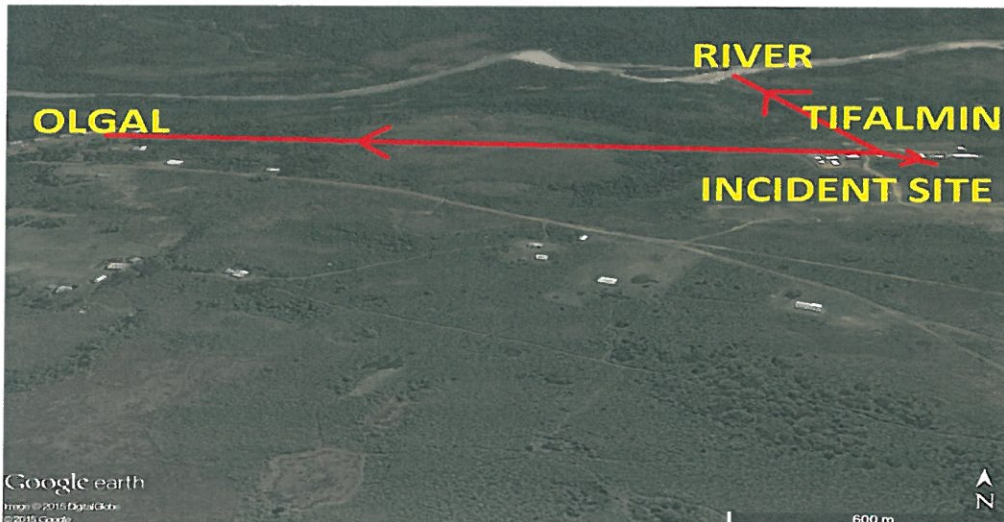


Fig 2: HCB Flight Plan Route

After landing at the Tifalmin Camp, at 03:35 UTC², on completion of the second of the three planned flights, the pilot reduced the power to ground idle, so the two passengers could disembark. A 100 ft longline

was attached to the helicopter. The pilot then increased power to flight idle and subsequently took off and manoeuvred the helicopter over the longline. The pilot was the sole occupant.¹

He reported that engine performance was normal as the helicopter commenced climbing. At a height of approximately 60 ft above the ground, while the pilot was looking outside the helicopter at the longline pickup, he noticed that the helicopter was not climbing and had actually started to descend.

The helicopter commenced an uncommanded turn due to decreasing rotor rpm as it was overhead a fence. The pilot reported that he attempted to increase power to maximum, but the engine did not respond. During that time the helicopter was observed to turn through at least 180 degrees. He applied the cyclic so the helicopter could fly clear of the fence. After clearing the fence he pulled collective in an attempt to cushion the landing. The helicopter landed heavily on the very soft dirt area near a pond. The pilot received minor injuries.

The helicopter sustained substantial damage to both of its landing-gear skids and substantial cracks on right the windshield and the right chin bubble during the impact with the soft dirt area. (Ref Fig 3, 4 &5). The fuselage belly panels and the bottom of the fin had minor damage.



Fig 3: Helicopter resting on its belly with bent skids

¹ The Visual Flight Rules (VFR) are the rules prescribed for visual flight by the Civil Aviation Safety Authority of PNG (CASA PNG) which stated that, within controlled airspace, an aircraft should be 2 km horizontally and 500 ft vertically clear of cloud with visibility of 8 km or more at or above 10, 000 ft AMSL.



Fig 4: Substantial crack on right windshield

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Fig 5: Cracks on chin bubble - right side

Aircraft Information

Aircraft Airworthiness Review and Maintenance

The AIC investigators examined the helicopter's maintenance history and determined the following. An aircraft Airworthiness Review (AAR) was carried out and certified on 15 February 2015, in accordance with (IAW) Civil Aviation Rules, Part 136.609. The last maintenance was a 300 hourly inspection carried out IAW

² The 24-hour clock is used in the report to describe the local time of day, Local Mean Time (LTM), as particular events occurred. Local Mean Time was Coordinated Universal Time (UTC) + 10 hours.

the Rolls-Royce Maintenance Manual (RRMM), Table 606, on the 22 May 2015. The helicopter was certified as being serviceable when dispatched for the flight.

Weight and balance

The investigation determined that the helicopter was within the prescribed weight and balance limits.

Fuel Used

The *Daily Fuel and Fuel Equipment Checklist* was carried out before the helicopter was dispatched on 22 July 2015. The base load master certified that the samples taken from the tank, filter and fuel nozzle were 'all good for use'. After the incident, fuel samples for Contamination Testing were drained from the airframe fuel filter, aft and forward sumps and CEFA. Intertek Laboratory analysis of the fuel samples found them to be contamination free and certified that the fuel samples met the specifications for Jet A-1 aviation turbine fuel.

Engine Examination

On 10 August 2015, a representative of the Rolls-Royce Corporation inspected the helicopter at the incident site, under the supervision of PNG Accident Investigation Commission Investigators. The helicopter was subsequently recovered to the operator's maintenance facility. The Rolls-Royce Preliminary Report stated as,

1. The engine was securely mounted to the aircraft and no external damage was noticed. The aircraft was equipped with an engine inlet barrier filter which was clean and normal in appearance. Control continuity was verified from the throttle twist grip to the hydromechanical Unit (HMU).
2. Turbine (N2) continuity was verified from the power turbine to the main rotor head and the tail rotor drive shaft, and the fourth stage turbine wheel was undamaged. Compressor (N1) continuity could not be verified as the compressor inlet was sealed.
3. All of the external electrical, oil and fuel lines were secured when checked by hand. The aircraft mounted oil system was undamaged and the scavenge filter pending bypass button was not extended. The oil filter was not inspected. Neither the upper nor lower engine magnetic chip detectors retained ferromagnetic debris. An accurate engine oil level could not be determined due to the aircraft angle of rest.
4. The aircraft mounted fuel filter was cleaned and was full of fuel. All of the fuel lines into the engine and between the HMU and Combined Engine Filter Assembly (CEFA) fuel filter were full of fuel. The fuel line between the horizontal fire shield and the fuel nozzle was also full of fuel. The CEFA fuel filter contained a dark coloured sludge which lined the filter bowl inner wall. The filter element displayed some of the debris, but it did not appear to restrict fuel flow through the filter. The pending bypass button was not extending on the filter housing. The fuel nozzle air shroud and fuel orifices displayed some carbon formation, which is normal.
5. The aircraft fuel pumps were tested and both operated normally. The fuel line from the aircraft fuel filter to the HMU exhibited chaffing on the outer skin adjacent to the engine cowling support; however fuel leakage was not observed.
6. The ECU was interrogated with only one anomaly noted. The ECU recorded an Ng speed exceedance up to 106.29% for the 1.06 seconds. However, it is not possible to determine when, during the history of this engine this moment had occurred.

The Rolls-Royce Corporation investigator recommended that the Operator should examine the fuel lines leading into and out of the aircraft mounted fuel filter, due to similar cases in the past where these fuel lines were twisted as a result of servicing the filter element. The Operator's borescope inspection found kinks on the hose P/N: 70-079H000Y150, which is the fuel line from the fire wall to the airframe fuel filter.



Fig 6: Hose P/N: 70-079H000Y150 KINK ON LINE AND BORESCOPE VIEW

The engine assembly was subsequently sent in a secure container to an approved Rolls-Royce Corporation engine overhaul facility in Brisbane, Australia (Asia Pacific Aerospace) for testing. The engine removal from the container and preparation for engine test running were carried out in the presence of representatives from Rolls-Royce Corporation (the engine manufacturer), Hevilift Ltd., (the operator), Asia Pacific Aerospace (the engine test facility), and the PNG Accident Investigation Commission.

The Investigation Report of the Engine Test was provided by the Asia Pacific Aerospace as detailed below.

1. There were two engine tests carried out with two different ECU IAW RRM250-C47B OHM. The 1st Test with slave ECU has the P/N: M250-10696, S/N: JG7A1W0062. The 2nd test with the original ECU has the P/N: 23088484 S/N: JG0ALK0633
2. Engine light up and accelerate to ground idle as normal with all parameters within limits, there is no sign of fuel or oil leakage and engine was slowly accelerate to take-off setting with no abnormality. Vibration scanning on Compressor, Gearbox and turbine throughout the test are all within limits. Engine sensor comparison check to test cell parameter are all within acceptable limits.
3. A repetitive engine acceleration and deceleration checks found all transients within acceptable limits with no sign of engine surges.
4. Following the final shutdown there is no unusual noise during engine coast down, magnetic plugs, oil filter, CEFA oil and fuel filter checked found no contamination.
5. Engine functional test complete with no discrepancy and engine performance found to be within manufacturer performance specifications.

The kinked fuel hose (an airframe component) was not sent to Brisbane with the engine.

AIC comment

The Reports from Intertek laboratory, Asia Pacific Aerospace (APA), Rolls-Royce Corporation and Hevilift Limited, assisted the AIC with its analysis. The AIC determined that:

1. The fuel was not a contributing factor. It was free of contaminants and met the required specifications.
2. No engine defect was found and engine performance was within the manufacturer's specifications.
3. The fuel hose P/N: 70-079H000Y150 was kinked, which may have caused a slight restriction in fuel flow.

The reason for the engine malfunction could not be conclusively determined. However, it is possible that the kink in the fuel hose may have caused a slight fuel flow restriction, contributing to a loss of power. The operator reported that they replaced the hose before putting the helicopter back into service.

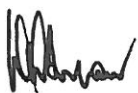
General Details

Date and time:	22 July 2015-13:35UTC	
Occurrence category:	Serious Incident	
Primary occurrence type:	Engine power loss-forced landing	
Location:	Tifalmin, West Sepik Province	
	Latitude: 05°06'58.54"	Longitude: 141°25'00.61"

Aircraft Details

Manufacturer and model:	Bell Helicopter B407	
Registration:	P2-HCB	
Serial number:	53141	
TTIS	17,240.4hrs	
Engine manufacturer and model:	Rolls Royce Corporation 250-C47B	
Engine Serial number	CAE-847324	
Type of operation:	Charter & Aerial Work	
Persons on board	Crew: 1	
Injuries to persons	Crew: 1 minor	
Injuries:	Crew: 1 Minor	Passengers:0
Damage	Cracked right windshield and chin bubble. Bent landing gear skids.	

Approved



David Inau, ML
Chief Executive Officer

13 October 2015