



PRELIMINARY REPORT

AIC 23-1003



Heli-Solutions

P2-HSM

Bell 407

Loss of Tail Rotor Thrust - Inflight

Northwest of Wapenamanda Airport

Enga Province

Papua New Guinea

18 February 2023

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)*, and the *Commissions of Inquiry Act 1951* and *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.

On 18 February 2023 at 12:29 local time (02:29 UTC), the AIC was notified by the Operator through a phone call of an accident involving one of their helicopters, a Bell 407 helicopter, registered P2-HSM, which occurred about 15 km from Wapenamanda Airport, Enga Province. The AIC immediately commenced an investigation, and a team was deployed to the accident site on 19 February 2023.

This Preliminary Aircraft Accident Investigation Report was produced by the AIC, and contains facts known to the AIC before the official release date. It is developed by the Commission in accordance with Para 7.1 of *ICAO Annex 13*. The report is also published on the AIC website: www.aic.gov.pg.

The report is based on the initial investigation activities carried out by the AIC in accordance with *Papua New Guinea Civil Aviation Act 2000 (as amended)*, *Chapter 31* of the *Commissions of Inquiry Act*, *Annex 13* to the *Convention on International Civil Aviation*, and the *PNG AIC Investigation Policy and Procedures Manual*. It contains factual information. Analysis of that information, findings and contributing (causal) factors, other factors, safety actions, and safety recommendations are reserved for the *Final Report*.

The sole objective of the investigation and the Preliminary Report is the AIC's obligation to the *Convention on International Civil Aviation* and in accordance with *ICAO Annex 13*, and thereby promote aviation safety. (Reference: *ICAO Annex 13, Chapter 7*). Readers are advised that in accordance with *Section 219* of the *Civil Aviation Act 2000 (as amended)* and *Annex 13*, it is not the purpose of the Commission's aircraft accident investigation to apportion blame or liability. Fact based statements in the report should not be interpreted as apportioning blame. Consequently, AIC reports are confined to matters of safety significance and may be misleading if used for any other purpose.



Capt. Aria Bouraga, MBE

Acting Chief Commissioner

20 March 2023

Loss of Tail Rotor Thrust – Inflight

Occurrence Details

On 18 February 2023, at about 11:40 local time (01:40 UTC¹), a Bell 407 helicopter, registered P2-HSM, owned and operated by Heli-Solutions, was conducting a single pilot VFR² passenger charter flight from Epopi Village to Wapenamanda Airport in Enga Province, when the helicopter experienced a complete loss of tail rotor thrust inflight resulting in an emergency landing about 3.5 nautical miles (NM) Northwest of Wapenamanda Airport.

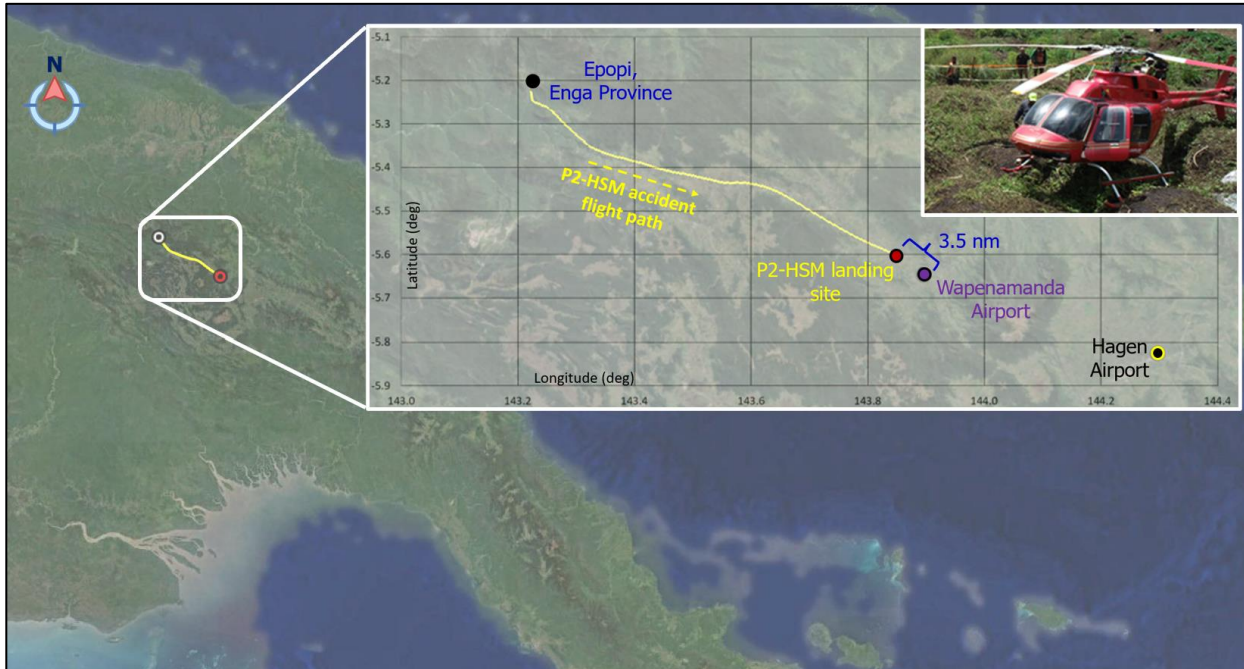


Figure 1: Overview of the P2-HSM accident flight and landing site

According to the Spidertracks³ recorded data, the helicopter departed from Epopi Village at 11:20, climbed to an altitude of 9,000 ft AMSL and then tracked Southeast of Epopi to Wapenamanda Airport. The pilot stated during interview with the AIC, that there was no significant weather along the route.

The pilot stated that he made an all stations radio broadcast reporting that he was 9 NM to west of Wapenamanda Airport, maintaining 9,000 ft. Following the broadcast, the pilot heard a sudden loud noise from the back of the helicopter. The pilot stated that he suspected it had emanated from the tail rotor. About 30 seconds later, he heard another loud bang from the back followed by severe vibration. The helicopter subsequently began pitching down and spinning.

The pilot stated that as soon as he realized that he had lost tail rotor authority, he decided to conduct an emergency landing. The helicopter was found to be at least 1,000 ft above ground level (AGL) at the time of the tail rotor failure. He actioned the *Bell Helicopter manufacturer's Manual, Complete Loss of Tail Rotor Thrust Emergency checklist*. The pilot landed the helicopter on a local garden in Kuimanda Village, about 3.5 NM Northwest of Wapenamanda Airport.

The pilot subsequently shut down the helicopter. The load master assisted the passengers to evacuate and move them away from the helicopter. The pilot subsequently called the Operator's base in Mt Hagen to advise them of the accident.

¹ The 24-hour clock, in Coordinated Universal Time (UTC), is used in this report to describe the local time as specific events occurred.

Local time in the area of the serious incident, Papua New Guinea Time (Pacific/Port Moresby) is UTC + 10 hours.

² Visual Flight Rules: Those rules as prescribed by national authority for visual flight, with corresponding relaxed requirements for flight instruments (Source: The Cambridge Aerospace Dictionary)

³ A satellite tracking device for aircraft. This enables the aircraft's position to be monitored from an internet connected device. It includes an 'SOS' button, which can be manually activated by the crew in an emergency.

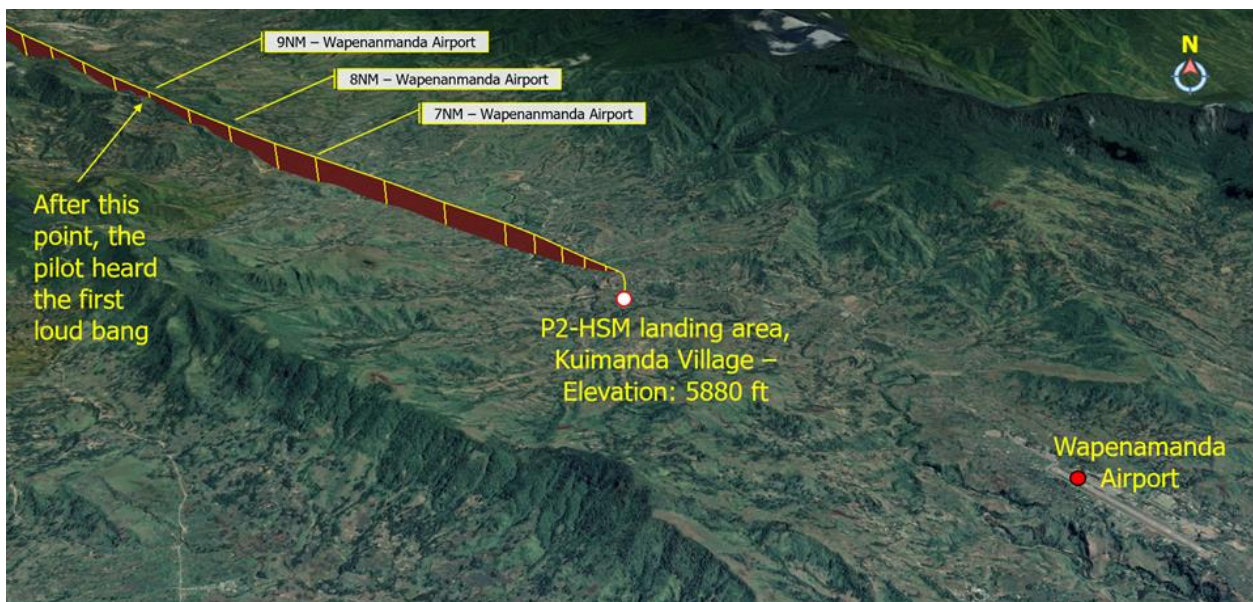


Figure 2: Overview of P2-HSM flight path from 9nm to the Landing site

During post-landing inspection, the pilot found that the tail rotor shaft was missing. The tail rotor shaft was later recovered by locals about 500 m from the point of landing.

No injuries were reported, however, the pilot and load master were transported to Mt. Hagen for medical attention at a Private Clinic.

Wreckage Distribution and Damages

The tail rotor shaft housing and tail rotor shaft assembly sustained significant damage.



Figure 3: P2-HSM wreckage distribution and the damages sustained

AIC comment

The investigation is continuing, and will include but not limited to flight operations, helicopter's systems, performance, airworthiness and serviceability, airstrip conditions, weather and organisational aspects, to the appropriate extent.

The investigation analysis and findings will be included in the Final Report.

Safety Actions

At the time of the issue of this Preliminary report, no safety actions had been taken.

Recommendations

At the time of the issue of this Preliminary Report, no Recommendation had been made by the PNG AIC

General Details

Date and time	18 February 2023, 11:26 (01:26 UTC)		
Occurrence category	Accident		
Primary occurrence type	Loss of Tail Rotor Thrust – Inflight		
Location	Kuimanda Village, 3.5 nm Northwest of Wapenamanda Airport, Enga Province		
	Elevation: 5,880 ft		
	Latitude: S 5°35'52.03	Longitude: E 143°50'44.77"	

Type of Operation, Injury, and damage details

Type of Operation	VFR, Charter Flight			
Persons on board	6	1 pilot	1 loadmaster	4 passengers
Injuries	Nil Injuries			
Damage	The helicopter sustained significant damage to its tail rotor assembly and rotor shaft			

Pilot Details

Gender	Male
Age	59
Nationality	Papua New Guinea
Licence type	CPL (H)
Total hours	17,448.4
Total hours in Command	16,178.9
Total hours on type	4,500

Aircraft Details

Airframe				
Aircraft manufacturer	Bell Helicopter			
Aircraft Model	Bell 407			
Registration	P2-HSM			
Serial number	53791			
Year of manufacture	2007			
TTSN	4,805.8			
Landings	7,933.5			
Engine				
Engine manufacturer	Roll Royce			
Engine Type	250-C47B			
Serial number	CAE-847797			
TTSN	1,427.9			
TSO	0			
Landings	4,644.0			
Main Rotor Blades (MRB)				
Manufacturer	Bell Helicopters			
Part Number	407-15015-011-137			
Serial Number	A-3454	A-3776	A-4023	A-4067
TTSO	3,948.5	3,798.5	2,104.0	2,104.0
Tail Rotor Blades (TRB)				
Manufacturer				
Part Number	406-016-100-119			
Serial Number	A-4669		A-4712	
TTSO	4,010 hours		4,010 hours	
Tail Rotor Gearbox				
Manufacturer	Bell Helicopters			
Part Number	406-040-400-121			
Serial Number	A-1728			
TTSO	3,510 hours			