



FINAL REPORT

AIC 22-1005



Pacific Helicopters

P2-PHA

Airbus MBB-BK117 D-2 helicopter

Fenestron sustained substantial damage during landing

Tari Hospital, Hela Province

Papua New Guinea

1 December 2022

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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 in accordance with *Annex 13* to the *Convention on International Civil Aviation*.

The objective 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.

It is not a function of the AIC to apportion blame or determine liability. At the same time, an investigation report must include relevant 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.

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ABOUT THIS REPORT

On 3 December 2022 at 09:20 local time (23:20 UTC), the AIC was notified by Pacific Helicopters via email, of an occurrence involving an Airbus MBB-BK117 D-2 helicopter, registered P2-PHA, operated by Pacific Helicopters Aviation and owned by Javelin Aviation Ltd, at Tari Hospital Helipad, Hela Province, Papua New Guinea. The AIC immediately gathered information regarding the occurrence and commenced the investigation.

This accident investigation *Final Report* has been produced by the AIC, P O Box 1709, Boroko 111, NCD Papua New Guinea. It has been approved for public release by the Commission in accordance with *Para 6.5 of ICAO Annex 13*. The report is published on the AIC website www.aic.gov.pg.

The report is based on the investigation carried out by the AIC under the Papua New Guinea *Civil Aviation Act 2000 (As Amended)*, and *Annex 13 to the Convention on International Civil Aviation*. It contains factual information, analysis of that information, findings and contributing (causal) factors, other factors, safety actions, and safety recommendations.

Although AIC investigations explore the areas surrounding an occurrence, only those facts that are relevant to understanding how and why the accident occurred are included in the report. The report may also contain other non-contributing factors which have been identified as safety deficiencies for the purpose of improving safety.

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*). Consequently, AIC reports are confined to matters of safety significance and may be misleading if used for any other purpose.



Maryanne J. Wal

Chief Commissioner

9 February 2024

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GLOSSARY OF ABBREVIATIONS

AGL	: Above ground level
AMSL	: Above mean sea level
AIC	: Accident investigation commission
AOC	: Air operator certificate
ATPL	: Airline transport pilot licence
CAR	: Civil aviation rules
CP	: Copilot
CASA	: Civil aviation safety authority
CPL	: Commercial pilot licence
ETA	: Estimated time of arrival
FOD	: Foreign object debris
PF	: Pilot flying
PIC	: Pilot in command
PM	: Pilot Monitoring
UTC	: Coordinated universal time
VTOL	: Vertical Take-Off Landing

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INTRODUCTION

SYNOPSIS

On 1 December 2022, at about 15:16 local (05:16 UTC), an Airbus MBB-BK117 D-2 helicopter, registered P2-PHA, operated by Pacific Helicopters and owned by Javelin Aviation Ltd was conducting a VFR medical evacuation (Medivac) flight from Fogomaio village, Southern Highlands Province to Tari Hospital, Hela Province, when during landing, a foreign object debris (FOD) ingested into the helicopter's fenestron and caused substantial damage.

There were two pilots, a loadmaster and other four passengers on board the helicopter. The patient was a pregnant woman.

The pilot in command (PIC) was the pilot flying and was occupying the right-hand seat. The co-pilot (CP) was the pilot monitoring and was occupying on the left-hand seat.

The helicopter departed Fogomaio at 14:52 and tracked Northwest for Tari in Visual Meteorological Conditions. The flight was uneventful, and it was a clear day with good visibility.

At 15:14, upon arrival at Tari circuit, the crew cancelled SAR watch and subsequently joined the circuit from a close right downwind. The crew proceeded with the flight and established on approach from the Northwest for landing at the Tari Hospital Helipad, less than 1 NM Northwest of Tari Airport apron.

While approaching, the crew noticed an excavation work carried out around the helipad. The crew stated to their surprise, it appeared cleaner and tidier than how it appeared in their previous flights, therefore, the crew decided to continue with the approach by conducting a VTOL approach.

About 10-15 ft above the helipad, the crew heard an unusual loud noise from the rear of the helicopter and immediately felt airframe vibrations. The PIC continued with the approach while the CP continued monitoring and touched down at 15:16.

Upon touchdown, the PIC set the aircraft on ground idle, handed over the aircraft controls to the CP and exited the helicopter to assess situation. He observed damage to the fenestron caused by foreign object debris (FOD); pieces of the denim material ingested into the fenestron from the ground during landing.

The PIC advised the CP of the damage observed and instructed the CP to shut down the helicopter. Once the helicopter came to a complete stop, the passengers and crew exited the helicopter.

There were nil reported injuries.

During the investigation, it was established that about 10-15 ft above the helipad, the helicopter's rotor downwash blew up the piece of denim material into the air and into the fenestron jamming the blades and subsequently the blades snapped off as a result. The recent excavation work around the helipad uncovered FOD's that remained free on the ground adjacent to the helipad and the dirt laden denim material could not be detected from the air by the crew as it blended into the ground and due to its size.

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1 FACTUAL INFORMATION

1.1 History of the flight

On 1 December 2022, at about 15:16 local (05:16 UTC¹) an Airbus MBB-BK117 D-2 helicopter, registered P2-PHA, owned by Javelin Aviation Ltd² and operated by Pacific Helicopters was conducting a VFR³ medical evacuation (Medivac) flight from Fogomaio village, Southern Highlands Province to Tari Hospital, Hela Province, when during landing, a foreign object debris (FOD) ingested into the helicopter's fenestron and caused substantial damage.



Figure 1: Overview of accident area

There were two pilots, a loadmaster and four passengers on board. The pilot in command (PIC) was the pilot flying and was occupying the right-hand seat. The co-pilot (CP) was the pilot monitoring and was occupying on the left-hand seat.

The Santos Aviation⁴ dispatch personnel at Moro tasked the crew to conduct a Medivac flight, to airlift a patient, from Fogomaio village to Tari Hospital. The PIC stated during the interview that the patient was a pregnant woman.

According to the recorded data⁵, the helicopter departed Fogomaio at 14:52, began tracking for Tari which was located Northwest of Fogomaio and climbed up to an altitude of 6,700 ft AMSL in VMC⁶. The crew's statement and the recorded data indicated that the flight was uneventful, and it was a clear day with good visibility.

At 15:12, when the helicopter was about 4 Nautical Miles (NM) from Tari Airport, the crew commenced the descent into Tari circuit, descending from 6,700 ft AMSL.

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 (Pacific/Port Moresby Time) is UTC +10 hours.

² Javelin Aviation Ltd is taken from the P2-PHA Certificate of Registration (CoR) issued by CASA PNG. Refer to Appendix A of this report to view the CoR.

³ Visual Flight Rules

⁴ Refer to Section 1.13.2 Organizational and Management Information

⁵ Refer to the data from the FA5000 combined Solid-State Cockpit Voice and Flight Data Recorder (SSCVFDR) and the Appareo V1000. Data from both recorders were extracted and synchronized. Refer to Section 1.11 Flight Recorders for more information.

⁶ Visual Meteorological Conditions

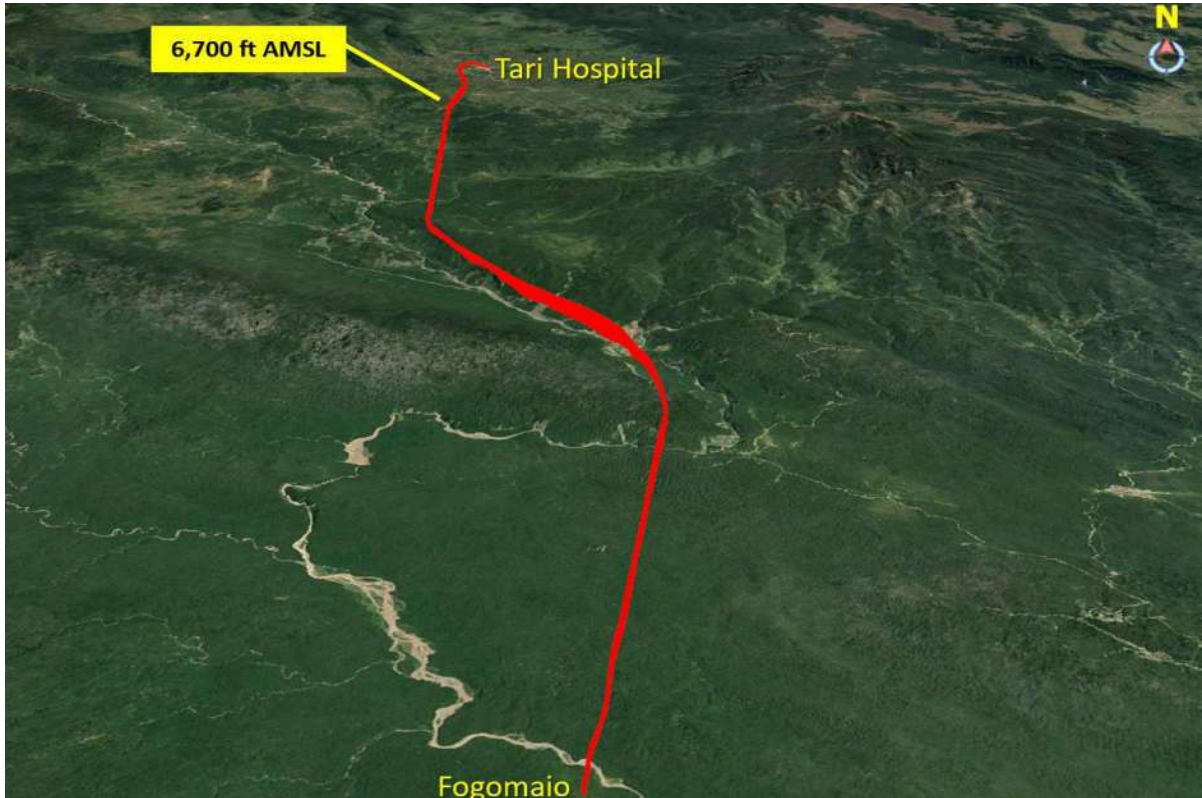


Figure 2: Flight path of P2-PHA

At 15:14, upon arrival at Tari circuit area, the crew called Air Traffic Services (ATS) and cancelled SAR⁷ watch.

The PIC stated during an interview that there was a local southeast wind favouring the Tari Airport Runway 14. Therefore, the crew elected to join a close right downwind, turned base, and subsequently established on approach from the Northwest for landing at the Tari hospital helipad, less than 1 NM Northwest of Tari Airport apron.

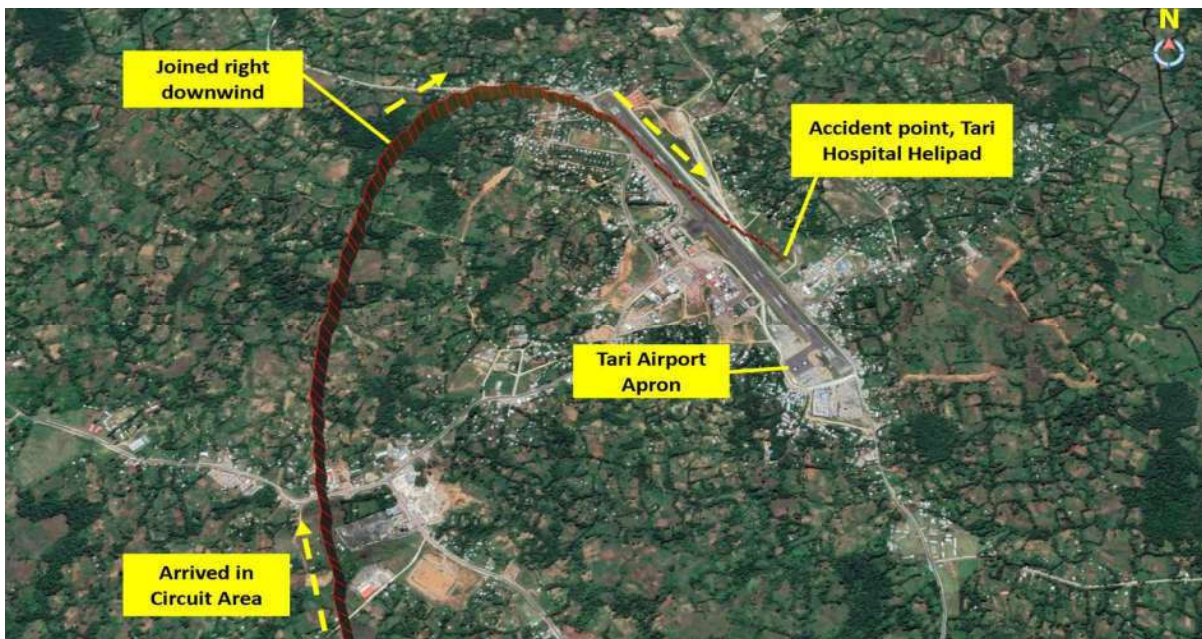


Figure 3: P2-PHA joining the circuit

⁷ Search and Rescue

While approaching, the crew noticed an excavation work carried out around the helipad. The crew stated during interview that the area, to their surprise, appeared cleaner and tidier than how it appeared in their previous flights.

The PIC subsequently informed the CP that he intended to conduct a normal VTOL⁸ approach to the helipad and nominated a committal height of 150 ft. The PIC commenced the VTOL approach into a 10-15 kts headwind.

According to recorded data, at about 10-15 ft above the helipad, the crew heard an unusual loud noise from the rear of the helicopter and immediately felt airframe vibrations. The crew stated that the PIC continued the approach for landing while the CP continued monitoring and trying to identify the cause of the sudden noise and vibration.

The helicopter touched down on the helipad at 15:16. Upon landing, the PIC set the aircraft on ground idle and handed over the aircraft controls to the CP, secured the controls and instructed the passengers to remain seated.

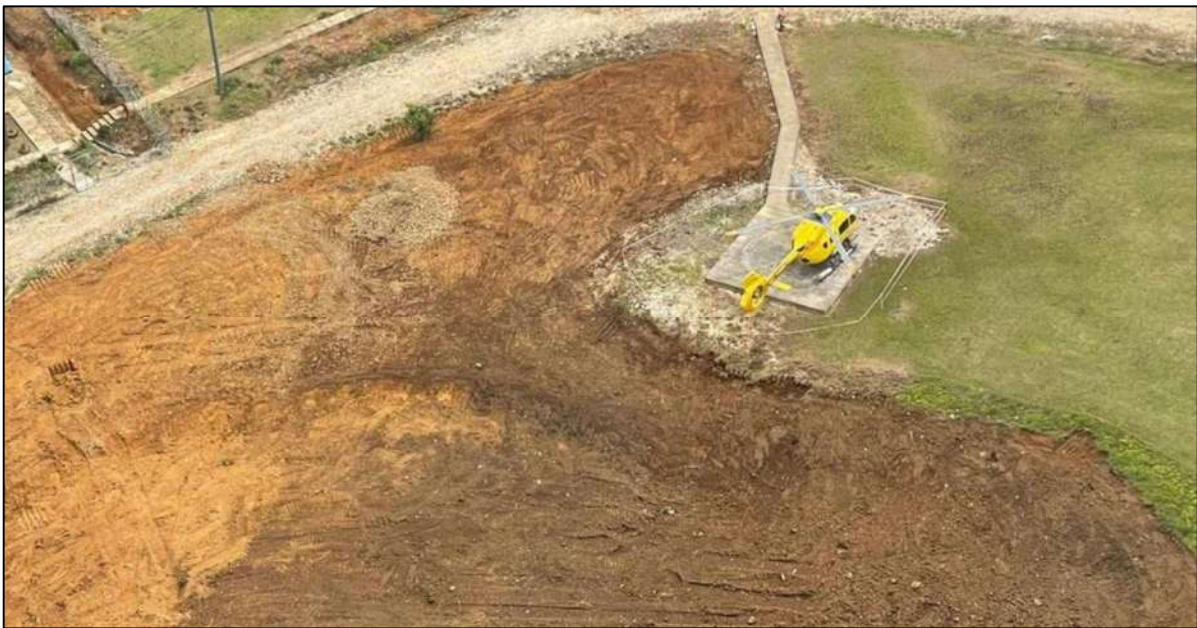


Figure 4: P2-PHA at the helipad

The PIC then exited the helicopter to assess the situation. He observed damage to the fenestron caused by a FOD; pieces of the denim material ingested into the fenestron from the ground during landing.

The CP shut down the helicopter following an instruction from the PIC. Once the helicopter came to a complete stop, the passengers and crew exited the helicopter.

⁸ Vertical Takeoff and Landing

1.2 Injuries to persons

Injuries	Flight crew	Passengers	Total Aircraft	inOthers
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	2	5	7	Not applicable
TOTAL	2	5	7	-

Table 1: Injuries to persons

1.3 Damage to aircraft

The helicopter's fenestron tail rotor assembly sustained substantial damage due to the ingestions of the FOD. Refer to *Section 1.12 Wreckage and Impact Information* for more information.

1.4 Other damage

There were no other damages to the surrounding or nearby facilities.

1.5 Personnel information

1.5.1 Pilot In Command (PIC)

Age	: 43 years
Gender	: Male
Nationality	: New Zealand
Position	: Line Pilot
Type of licence	: ATPL (Helicopter)
Rating	: H145; BH-212; BH-412; BH-206; AS355; AS350
Total flying time	: 6,550.2 hours
Total hours in Command	: 6,089.2
Total hours on type	: 451.9
Total hours last 90 days	: 85.6 hours
Total last 7 days	: 12.7 hours
Total last 24 hours	: 6.2 hours
Total on duty last 48 hours	: 14.0 hours
Total rest period(s) last 48 hours	: 2 rest periods
Medical class	: One
Valid to	: 16 May 2023
Medical limitation	: NIL

The PIC training records provided by Pacific Helicopters to AIC showed that the PIC held the appropriate requirements regarding License as required by the PNG Civil Aviation Rules. The training records showed that all general check and training requirements were in accordance with the existing Civil Aviation Rule (CAR) requirements and the Operators training programmes.

The PIC's records also showed that he was familiar with the Tari Hospital Helipad area.

1.5.2 Copilot (CP)

Age	: 70 years
Gender	: Male
Nationality	: New Zealand
Position	: Line Pilot
Type of licence	: ATPL (Helicopter)
Rating	: H145; BK117; BH-212; BH-412
Total flying time	: 16,771.7 hours
Total hours in Command	: 11,453.6
Total Hours on type	: 652.0
Total last 90 days	: 100.0 hours
Total last 7 days	: 11.1 hours
Total last 24 hours	: 6.2 hours
Total on duty last 48 hours	: 11.0 hours
Total rest period(s) last 48 hours	: 2 rest periods
Medical class	: One
Valid to	: 7 August 2022
Medical limitation	: Spectacles.

The CP training records provided by Pacific Helicopters to AIC showed that the CP held the appropriate requirements regarding License as required by the PNG Civil Aviation Rules. The training records showed that all general checks and training requirements were in accordance with the existing Civil Aviation Rule (CAR) requirements and the Operators training programmes.

The CP's records also showed that he was familiar with the Tari Hospital Helipad area.

1.6 Aircraft information

1.6.1 P2-PHA Aircraft Data

Aircraft manufacturer	: Airbus Helicopters Deutschland GmbH
Model	: MBB BK117 D-2
Serial number	: 20042
Year of manufacture	: 2015
Total airframe hours	: 3,401.28
Total airframe cycles	: 9,030.00
Registration	: P2-PHA
Certificate of Registration number	: 366
Certificate of Registration issued	: 16 May 2022
Certificate of Registration valid to	: Perpetual
Name of the Owner	: Javelin Aviation Limited
Name of the Operator	: Pacific Helicopters
Certificate of Airworthiness number	: 13 April 2018
Certificate of Airworthiness issued	: 13 April 2018
Certificate of Airworthiness valid to	: Non-terminating

1.6.2 Engine data

Manufacturer	: Safran Helicopter Engines
Model	: Arriel
Engine type	: 2E

No. 1 Engine (Left)

Serial number	: 60319
Total time since new	: 1,765.42
Total time since overhaul	: 0.0
Total cycles since new	: 4,628.0

No. 2 Engine (Right)

Serial number	: 60045
Total time since new	: 3,230.68
Total time since overhaul	: 0.0
Total cycles since new	: 2,169.0

Both engines were operational and were not a contributing factor to the accident.

1.6.3 Fenestron

1.6.3.1 Tail Rotor Hub

Manufacturer : Airbus Helicopters Deutschland GmbH
Model : D640M1001102
Serial number : M141
Total Time Since New : 3,401.28

1.6.3.2 Tail Rotor Blades

Manufacturer : Airbus Helicopters Deutschland GmbH
Part Number : D641M1001103
Serial Number :

1729	2492	2475	2757	2756	2783	2787	2777	2771	2809
3112	2613	2613	2223	2223	2223	2223	2223	2223	2223

Total Time Since New :

3112	2613	2613	2223	2223	2223	2223	2223	2223	2223
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The fenestron tail rotor assembly was serviceable and operational during the accident.

1.6.4 Airworthiness and Maintenance

At the time of the accident, the helicopter had a current Certificate of Airworthiness (CoA), Certificate of Annual Airworthiness Review (AAR), Certificate of Registry (CoR) and was certified as being airworthy. The maintenance records were reviewed during the investigation and identified that there were no outstanding scheduled maintenance and defects. Therefore, the helicopter was serviceable at the time of the accident.

1.6.5 Aircraft Loading

According to the *Flight Manual BK 117 D-2, effective 2022*, P2-PHA had a gross mass limitation of 3,700 kg.

The investigation requested the Operator to provide the flight manifest for the accident flight, however, the Operator was unable to provide the document. Therefore, the AIC could not determine the actual landing weight of the accident flight.

According to the Operator's *Occurrence Investigation Report* provided to AIC, the landing weight of the accident flight was estimated by the crew to be 3,580 kg.

Based on the estimation provided by the Operator, the investigation determined the helicopter was within permissible limits during the landing.

1.7 Meteorological information

1.7.1 Weather Forecast - PNG National Weather Service

The Tari terminal aerodrome forecast (TAF) was issued at 10:30 (local) for 1 December 2022 as follows: The validity of the forecast was from 12:00 to 23:00.

Wind	Variable at 3 kts
Visibility	Greater than 10 km with light showers in area
Cloud	Scattered at 1600 ft Broken at 3000 ft
Inter	Valid 12:00 to 23:00
Visibility	4000 m in heavy showers
Cloud	Broken at 800 ft
QNH	1016 1018 1017

Table 2: TAF on Tari, Hela Province

1.7.2 Actual Weather in Tari

The pilot stated during the interview that there was a clear day with good visibility and scattered clouds in the Tari Airport area. The wind was about 10 to 15 kts from the Southeast.

According to the recorded data, the wind speed parameter reading was between 10 and 15 kts. The wind direction parameter reading had a maximum peak of 230° then gradually decrease below 180°. This indicates that the wind was blowing from both directions, Southeast and Southwest.

1.8 Helipad information

1.8.1 Geneal Information

The helipad was located within the Tari Hospital's perimeter fencing and was about 500m Northwest of Tari Airport apron. The helipad is owned by Hela Provincial Health Authority and managed by Santos Aviation Ltd. It is used by the helicopter operators for medivac operations.



Figure 5: Helipad in reference to Tari Airport Apron

1.8.2 Helipad Data – Master Register

The *Helipad & Landing Site Master Register* provided by the Operator and Santos Aviation Limited contained the following information regarding the Tari Hospital Helicopter Landing Site (HLS):

- ✎ HLS Class: 2
- ✎ Coordinates: 5°50'45.48"S, 142°56'59.21"E
- ✎ Pad Construction: Concrete
- ✎ Pad Dimension: 7m x 7m
- ✎ Final Approach and Take off Area :30m x 15m
- ✎ Elevation: 5480 ft (AMSL)
- ✎ Authority: Santos/Oil Search Foundation

1.8.3 Crew observations during the approach

The crew stated during an interview with the AIC that during the approach, they noticed that the area around the helipad had recently been excavated. They also noticed that it was cleaner and tidier than the last time they landed on the helipad, therefore, they decided to continue with the approach.

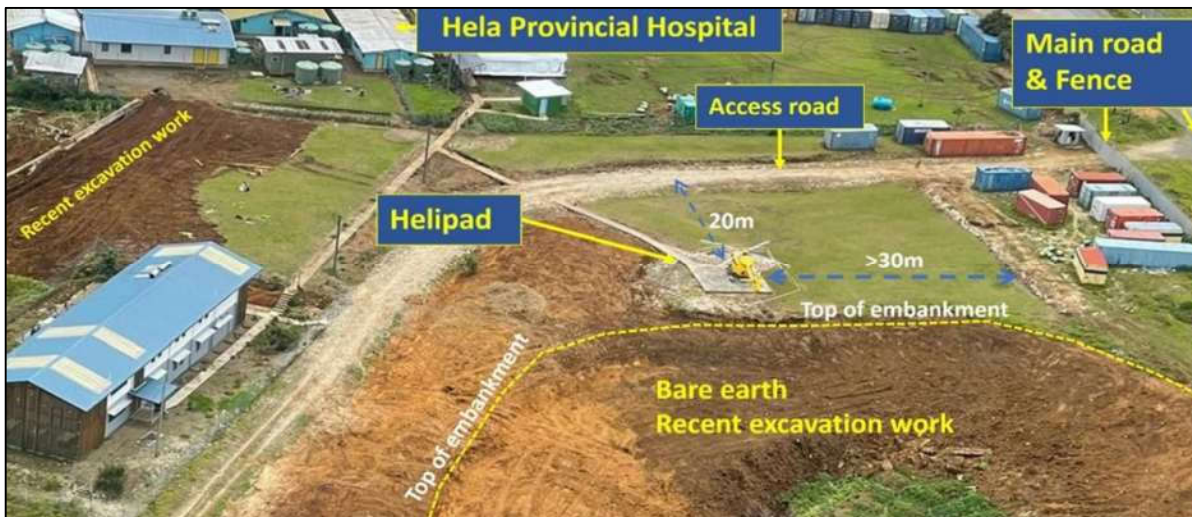


Figure 6: Aerial view of the helipad and its vicinity at Tari Hospital

1.9 Flight Recorders

The helicopter was fitted with an L3 Harris FA5001 combined Solid-State Cockpit Voice and Flight Data Recorder (SSCVFDR). The combi recorder had 2 hours recording duration for audio; captain microphone, copilot microphone, third crew member microphone and more than 25 hours of flight data.

The combi-recorder was downloaded by the Operator and the data was provided to AIC for readout, playback, analysis, and was used as a complement to the investigation.

1.9.1 Other Electronic Data Recording Device

1.9.1.1 Appareo Vision 1000

An Appareo Vision 1000 data monitoring recorder was installed on PHA and was serviceable at the time of the accident.

The VISION 1000 Cockpit camera system is a stand-alone cockpit imaging and Flight Data Monitoring (FDM) device. The system captures critical inertial and positioning data (location, attitude, speeds, etc.) as well as cockpit imagery (instrument panel, flight controls, partial exterior view) and ambient sound.

The recorded data for the accident flight was extracted from the recording medium as a complement to the investigation.

1.10 Wreckage and impact information

1.10.1 Fenestron Tail Rotor System

During the investigation, the Operator provided AIC with images of the landing site, helipad, and damage sustained by the helicopter's tail rotor. AIC observed from the images that the helicopter's fenestron tail rotor system sustained significant damage and multiple components of the system were destroyed and snapped off. Provided below in the table, the list of components was destroyed.

Component	Description of the damage
Rotor Blades	All ten rotor blades of the fenestron tail rotor were shredded. The damage was consistent with external impact, suggesting a foreign object had entered the rotor area.
Stator Vanes	Six of the stator blades were affixed to the central hub (head), but they exhibited noticeable dents and bends. The extent of damage indicated a forceful impact.
Central Hub	The central hub sustained fractures and deformations on the hub structure. The head's covering was shattered with the rotating blades.
Tail rotor structure	The inner housing of the tail rotor exhibited widened fractures, which were likely caused by the stress impact force. This damage compromised the structural integrity of the shroud.

Table 3: List of components destroyed



Figure 7: Damage sustained to the fenestron and its components

The Operator's on-site team also identified that a FOD had been caught in the helicopter's fenestron. The FOD was a piece of denim material that was blown up in the air by the helicopter's rotor downwash and ingested into the fenestron causing substantial damage fenestron and damaging its components.



Figure 8: FOD - Pieces of the denim material

The AIC also did not observe any evidence to indicate that the helicopter had a landing or ground contact damage. The damage to the aircraft was limited to the fenestron from the FOD contact.

1.11 Survival aspects

The PIC stated during the interview that after landing the helicopter, he handed control over to the CP and advised all passengers to remain seated while he went out to assess the damage. Following his assessment, he advised the passengers to disembark the aircraft.

The exit was reportedly normal and in an orderly fashion with no injuries to the crew, passengers, or the patient. The patient was also checked and appeared normal. She was subsequently carried out of the helicopter and taken to the hospital for the intended medical attention.

It was identified that a normal disembarkation was conducted safely with no further event.

1.12 Organisational and management information

1.12.1 Pacific Helicopters and Santos Aviation Limited

Pacific Helicopters maintains an Air Operators Certificate (AOC) 119/018 issued under Part 119 for rotary wing air operations in accordance with Parts 119 and 136. Pacific Helicopters also has a Maintenance Organisation Certificate (MOC) # 145/018. In addition to Goroka, Pacific Helicopters maintains operating bases in Port Moresby and Moro.

Santos Limited is a global energy company with operations across Australia, Papua New Guinea, Timor-Leste, and North America. Santos head office is located in Adelaide, South Australia. Santos Limited PNG office is based in Moro, Lake Kutubu, Southern Highlands Province. Santos had merged with PNG based Oil Search Limited (OSL) in 2021.

Pacific Helicopters also operate under a contract agreement with Santos Aviation Limited. Under the agreement, Pacific Helicopters conduct air operations as required by Santos Aviation.

1.12.2 Tari Hospital Helipad

According to Santos, Tari Hospital Helipad is defined as Class 2 HLS's as:

- *A Permanent Remote Area Helipad is designed for ongoing use (>90 days) at remote areas such as communications towers, pipeline servicing and well pads, or at local hospitals where Class 1 is impractical. Fewer than 90 landings each quarter would be expected.*
- *Helicopters operating to Class 2 helipads shall have better than HOGE⁹ performance.*
- *Class 2 HLS¹⁰s shall be reassessed at least every twelve months. The assessment should include review of the HLS physical condition and layout, grass and shrub growth that may impinge on the Clear and Obstacle free areas, as well as the departure/approach paths. Should the Class 2 HLS not be reassessed within the twelve-month period, the HLS will revert to a Class 5 HLS (with approval from GMOPS) until the reassessment has been completed.*

The last assessment date for the Tari Hospital Helipad was on 29 April 2019. The next date for the assessment of the helipad was 29 April 2020, twelve-months after the last time it was assessed. However, there was no evidence to show that an assessment was carried out by Santos on 29 April 2020, up until the date of the accident.

⁹ Hover out of Ground Effect. Hovering out of ground effect is the same as hovering in ground effect except that it will generally require more power due to not being in ground effect.

¹⁰ Helicopter landing sites

The investigation also identified that Santos HLS register still maintained the Tari Hospital Helipad as a Class 2 HLS.

Also, according to Santos requirement,

- *A site that would normally be considered a Class 1,2 or 3 HLS:*
 - ☞ *but does not fully conform with this procedure; and*
 - ☞ *has been assessed as being suitable to remain in service with caveats or for specific purposes, or*
 - ☞ *is a Class 1,2 or 3 HLS that has not been reassessed within the required periods.*

- *The use of such a site requires:*
 - ☞ *a risk assessment,*
 - ☞ *identification of the non-conformances that are listed in the HLS Register*
 - ☞ *agreement by the helicopter operator; and authorization or approach to use by GMOPS¹¹.*

There was no evidence provided by Santos to show that a risk assessment was carried out on Tari Hospital Helipad, nor was there evidence provided to show identification of non-conformances.

In addition, Pacific Helicopters and Santos Aviation confirmed that they were not aware of the excavation work being carried out prior to that flight. Although the helipad remained intact, the area around it was excavated.

11 General Manager Operations

2 ANALYSIS

2.1 General

The analysis part of this Draft Report will discuss the relevant issues resulting in the accident involving helicopter P2-PHA. The investigation determined that there were no issues with the aircraft and all systems were generally operating normally.

The analysis will therefore focus on the following issues: landing site and crew decision making.

2.2 The Helicopter Landing Site

The Tari Hospital Helicopter Landing Site (HLS) did not meet the Standards set for consideration as a Class 2 HLS. The investigation found that the managing authority, Santos Ltd, had not completed a 12 monthly HLS assessment for the Tari Hospital HLS since the last assessment in November of 2019. This assessment would have involved the inspection of the physical condition and layout, vegetation growth that may impinge on the Clear and Obstacle free areas, as well as the departure/approach paths.

Although the Santos Operation Manual states that any Class 1, 2 or 3 HLS that has not been assessed within 12 months will be reclassified to class 5 until an assessment is carried out, their HLS register maintained the Tari Hospital HLS as a Class 2 HLS. The investigation also determined that Tari Hospital HLS should have been reverted to a Class 5 HLS as of 29 April 2020 when the assessment was not carried out.

Santos Aviation, as the Tari Hospital HLS managing authority were not aware of the condition and the activities being carried out at the HLS. They were supposed to be aware of any activities that the condition of the condition of a controlled HLS and situated within a controlled environment.

The AIC found that there was no risk assessment carried out at the HLS. There was also no evidence to show that an identification of non-conformances. It is the view of the AIC that any activities around the helipad were not coordinated, and Santos was not aware of the excavation activities being carried out by the hospital. The fact that the HLS authority was not aware of activities around the HLS and the general condition of the HLS was itself considered a non-conformance.

The Operator agreed with the HLS authority to conduct flights into the HLS and had operated several flights into the HLS, however, the data contained in the Santos HLS register shows information from the 2019 register.

The crew themselves conducted aerial assessments for every approach before landing. The crew's aerial assessment conclusion was that the area was cleaner and tidier than the last time they approached and landed. In this instance was a piece of dirty jeans near the helipad. The material was not visible from the air as dirt on it made it blend into the ground and because it would have been too small to be noticed from the air.

It would therefore seem necessary for a ground inspection to be conducted prior to allowing any further operation on the HLS.

Furthermore, the Tari Airport is operational, available, and less than a mile away from the helipad. Again, however, neither the Operator, nor the HLS managing authority was aware that there was excavation work being carried out near the helipad and a decision would have been made for the helicopter to land at Tari Airport.

The investigation also identified that there is no one responsible for establishing the condition of the helipad and the surrounding areas of the helipad and passing the information to the medivac crew. The Moro Base Manager only seeks weather information and passes it on to the crew.

2.3 Crew decision making

Although the crew were surprised to see significant change in the physical characteristics of the HLS, they decided to continue to approach because the area looked cleaner and tidier than they had observed in past flights.

It is the view of the AIC that the piece of denim material would have been impossible for the crew or any crew to:

- identify as a piece of cloth on the ground because it was dirt laden and blended into the ground, it was small compared to the appearance of the excavated HLS to the approaching crew. Following their aerial inspection, the helipad was suitable for normal approach and landing. This led to the decision to continue to the helipad and disregard any alternative landing site. The operation was a medivac flight and there was an urgency to get the patient to the hospital without delay.
- If detected and observed, it would still appear like the top of a rock protruding from the ground.

2.3.1 Coordination

The fact that HLS managing authority was unaware of the ongoing excavation activities around, there was personnel on the ground at Tari. However, the AIC found that he was an employee of the security company that is subcontracted by Santos Limited to provide security for the helipad. The Santos dispatch provide information to Operators for weather conditions only.

3 CONCLUSION

3.1 Findings

3.1.1 Aircraft

- a) The aircraft had a valid Certificate of Airworthiness, Certificate of Registration, Certificate of Annual Airworthiness Review and had been maintained in compliance with the regulations.
- b) The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.

3.1.2 Crew/pilots

- a) The crew were licensed and qualified for the flight in accordance with existing regulations.
- b) The crew were properly licensed, medically fit and adequately rested to operate the flight.
- c) Proficiency and Recency requirements were met by the crew.
- d) The crew had significant experience on the helicopter type and PNG operation.
- e) The crew were familiar with the Tari Hospital Helipad area.

3.1.3 Flight operations

- a) Normal radio communications with the relevant ground units.
- b) The crew were not aware of the condition of the Tari Hospital Helipad and its surrounding prior to observing the area during approach.
- c) The crew assessed the helipad and its surrounding and identified that it was cleaner and tidier than the last time they approached, therefore, they elected to continue with the approach.

3.1.4 Helicopter Landing Site

- a) The helipad did not meet the criteria of the Class 2 HLS as assigned since 29 April 2019
- b) The helipad should have been reverted to Class 5 HLS as of 29 April 2020, the date for the next assessment which did not eventuate.
- c) The Tari Hospital Helipad was under the authority of Santos Aviation.
- d) The excavation work was conducted for the Hospitals own purposes and not related helicopter operations into and out of the helipad.
- e) Santos Aviation Ltd and Pacific Helicopters were not aware of the excavation work at the Tari Hospital prior to the occurrence.
- f) Excavated area adjacent to the Tari Hospital Helipad. The excavated area was in the final approach and take off path (FATO)
- g) Tari Hospital Helipad was a non-conforming HLS which was overdue for an inspection by Santos Aviation.

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3.2 Contributing factors/Causes

- As the helicopter was about 10-15 ft above the helipad over the newly excavated area, helicopter's rotor downwash blew up the piece of denim material into the air and into the fenestron jamming the blades. As a result, the ten rotor blades snapped.
- The approach was conducted over a recently excavated area that had not been inspected prior to the flight.
- The recent excavation work around the helipad uncovered FOD's that remained free on the ground adjacent to the helipad. The dirt laden denim material could not be detected from the air as it blended into the ground and due to its size.
- The crew previous trips to the hospital, the crew thought the area was tidier and appeared free of obstacles. Because of that conclusion, they decided to continue to the helipad rather than divert to the Airport.
- The area had not been inspected following the excavation work to ensure it was clear of FOD's.
- The aerial assessment of the crew was such that they believed the area was clearer of obstacles than in the past.

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4 SAFETY ACTIONS AND RECOMMENDATIONS

There was no safety recommendation derived from this investigation. However, during the investigation, the Operator informed AIC through their Occurrence Investigation Report of the Safety Actions that were taken and proposed following the accident as follows.

Helipad Register

Safety Action taken:

Client update helipad register to note the Tari Hospital Helipad is closed and all future Medevacs land at the Tari Airport Apron

Regular Assessments

Safety Action Taken:

Client conducts regular assessments of all helipads used within the client project area.

Closure of Tari Hospital Helipad



Safety Action taken:

In the interim Pacific Helicopters Flight Operations Manager is to issue a Memo advising Tari Hospital Helipad is closed until further notice

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5 APPENDICES

5.1 Appendix A: P2-PHA Certificate of Registration

 CIVIL AVIATION SAFETY AUTHORITY OF PAPUA NEW GUINEA CERTIFICATE OF REGISTRATION No: 366		
1. Nationality or common mark and registration mark	2. Manufacturer and manufacturer's designation of aircraft	3. Aircraft serial no
P2- PHA	AIRBUS HELICOPTERS MBB-BK117 D2	20042
4. Name of owner:	JAVELIN AVIATION LIMITED	
5. Address of owner:	LATTICHSTRASSE 1A CH-6340 BAAR (ZG) SWITZERLAND	
6. It is hereby certified that the above described aircraft has been duly entered on the Papua New Guinea Register of Aircraft in accordance with the Convention on International Civil Aviation dated 7 December 1944, and with the Civil Aviation Act 2000, (as amended) and the Civil Aviation Rules Part 47.		
Date of issue: <u>16 MAY 2022</u>	Signature:  Civil Aviation Safety Authority of Papua New Guinea	
7. Name and address of Operator:	PACIFIC HELICOPTERS LIMITED PO BOX 342 GOROKA EHP 441 PAPUA NEW GUINEA	
Form CA 47-00 Rev 4: 03/2018		