



FINAL REPORT

AIC 26-1002

27 October 2026

OPERATOR	:	Tropicair Limited
REGISTRATION	:	P2-BBM
MANUFACTURER	:	De Havilland Aircraft of Canada
MODEL	:	DHC-6-300 Twin Otter
CLASS/CATEGORY	:	Nose Wheel Separation on Impact with Obstacle During Take-Off
LOCATION	:	Tapini Airstrip, Central Province, Papua New Guinea
OCCURRENCE DATE	:	22 January 2026



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TABLE OF CONTENTS

TABLE OF CONTENTS	ii
FIGURES	v
TABLES	vi
DEFINITIONS AND INTERPRETATION	vii
ACRONYMS	viii
INTRODUCTION	ix
Investigation AIC 26-1002	ix
SYNOPSIS	xi
1. FACTUAL INFORMATION	1
1.1 History of the Flight	1
1.1.1 Arrival at Tapini Airstrip	2
1.1.2 Departure from Tapini Airstrip	2
1.1.3 Return Flight and Emergency Landing at Jacksons International Airport	3
1.2 Injuries to Persons	5
1.3 Damage to Aircraft	5
1.4 Other damage	6
1.4.1 Tapini Airstrip	6
1.4.2 Jacksons International Airport, Port Moresby	6
1.5 Personnel Information	6
1.5.1 Pilot in Command	6
1.5.2 Co-pilot	7
1.6 Aircraft Information	7
1.6.1 Aircraft	8
1.6.2 Engine	8
1.6.3 Propeller	9
1.6.4 Airworthiness and Maintenance	9
1.6.5 Aircraft Weight and Balance	9
1.7 Meteorological Information	9
1.7.1 PNG National Weather Service Area Forecast for Area 2	9
1.7.2 PNG National Weather Service Terminal Aerodrome Forecast	10
1.8 Aids to Navigation	11
1.9 Communication	11
1.10 Aerodrome Information	11
1.10.1.1 Crew Observation	11

1.11	Flight Recorders.....	13
1.11.1	Other Electronic Data Recording Device	13
1.12	Wreckage and Impact Information	13
1.12.1	General Description of the Accident Site – Tapini Airstrip	13
1.12.2	Wreckage Distribution and Recovery	14
1.12.3	Nose Landing Gear Assembly Examination	16
1.12.4	Jacksons International Airport emergency landing	16
1.13	Medical and Pathological Information	17
1.14	Fire.....	17
1.15	Survival Aspects	17
1.16	Tests and Research.....	17
1.17	Organisational and Management Information.....	17
1.17.1	The Operator: Tropicair Limited	17
1.17.2	Tapini Airstrip Operational Environment and Runway Condition Risks	18
1.18	Additional Information.....	18
1.18.1	Nose Wheel steering	18
1.18.2	Witness Video Footage and Appareo Cockpit Imagery	19
1.18.3	Tropicair de Havilland Canada DHC-6-300 Standard Operating Procedures	19
1.19	Useful or Effective Investigation Techniques	20
2.	ANALYSIS	21
2.1	Flight Operations	21
2.1.1	Take-off and Directional control	21
2.1.2	Component Structural damage	22
3.	CONCLUSIONS.....	25
3.1.	Findings	25
3.1.1	Aircraft	25
3.1.2	Flight Crew/Pilots	25
3.1.3	Flight Operations	25
3.1.4	Air Traffic Services and Airport Facilities.....	26
3.1.5	Flight Recorders.....	26
3.1.6	Medical.....	26
3.1.7	Survivability	26
3.1.8	Safety Oversight	27
3.2	Causes [Contributing factors]	27
4.	SAFETY ACTIONS	28
4.1	Safety Actions Taken During the Investigation.....	28

5 APPENDICES.....	30
5.1 Appendix A: Timeline P2-BBM take-off roll at Tapini Airstrip	30
5.2 Appendix B: Tropicair de Havilland Canada DHC-6-300: Standard Operating Procedures (SOP) 31	
5.2.1 Appendix B1 Ground Operations -Taxiing.....	31
5.2.2 Appendix B2: Special Aerodrome Operations-Training	31
5.3 Appendix C: Diagram of Damage to Nose Landing Gear (NLG) Assembly – Nose Wheel	32

FIGURES

Figure 1. Flight Path from Tapini Airstrip, Central Province to Jacksons International Airport, Port Moresby.....	1
Figure 2. Overview of P2-BBM Take-off roll sequence at Tapini Airstrip.	3
Figure 3. P2-BBM on return flight to Port Moresby, informed in cruise of the of detached Nose Wheel Assembly.	3
Figure 4. P2-BBM' s Emergency Landing Phase at Jacksons International Airport.	4
Figure 5. P2-BBM after the emergency landing on RWY 32L at Jacksons International Airport. ...	5
Figure 6. Tapini Airstrip.	12
Figure 7. Strip surface conditions and tractor's tyre marks at Tapini Airstrip on the day of the accident.	12
Figure 8. RWY 32L, Jacksons International Airport, Port Moresby (AYPY) – Source: PNG Aeronautical Information Publication (AIP).....	13
Figure 9. Tyre Markings as it tracked along RWY 09 and entered the overgrown vegetation at the runway strip edge.....	14
Figure 10. Overview of P2-BBM track along RWY 09 - Tapini Airstrip.	14
Figure 11. Vegetation (grass) lodged in the left wing-tip of P2-BBM.	15
Figure 12. Vegetation (grass) barbed and mesh wire lodged on the Right Main Landing Gear (MLG) of P2-BBM at Jackson International Airport.	15
Figure 13. Examination of the Nose Landing Gear Components at the AIC Engineering Facility.	16
Figure 14. P2-BBM track on RWY 32L - Jacksons International Airport, Port Moresby (AYPY).	16

TABLES

Table 1. Accident Summary.	1
Table 2. Injuries to Persons.	5
Table 3. PIC Personnel Information.	6
Table 4. Co-pilot Personnel Information.	7
Table 5. Aircraft data.	8
Table 6. Engine data.	8
Table 7. Propeller data.	9
Table 8. Area Forecast for Area 2.	10
Table 9. Terminal Aerodrome Forecast (TAF) – AYPY.	10
Table 10. Tapini Airstrip Data (Source: Tropicair DHC-6 Route Guide).....	11

DEFINITIONS AND INTERPRETATION

Accident	An occurrence associated with the operation of an aircraft resulting in fatal or serious injury, or substantial damage to the aircraft.
Accredited representative	A person designated by a State, on the basis of his or her qualifications, for the purpose of participating in an investigation conducted by another State. The accredited representative would normally be from the State's accident investigation authority.
Contributing Factor	An action, omission, or condition that increased the likelihood or severity of the accident
Safety Recommendation	A proposal of an accident investigation authority based on information derived from an investigation, made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident.
Serious Incident	An incident involving circumstances indicating that there was a high probability of an accident associated with the operation of an aircraft.
State of Design	The State having jurisdiction over the organisation responsible for the type design
State of Manufacture.	The State having jurisdiction over the organisation responsible for the final assembly of the aircraft, engine or propeller
State of Occurrence.	The State in the territory of which an accident or incident occurs

ACRONYMS

AGL	Above Ground Level
AIC	Accident Investigation Commission (PNG)
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
ATC	Air Traffic Control
ATPL	Airline Transport Pilot License
ATS	Air Traffic Service
CASA PNG	Civil Aviation Safety Authority of Papua New Guinea
CAR	Civil Aviation Rules
CPL	Commercial Pilot License
CSN	Cycles Since New
CVR	Cockpit Voice Recorder
Deg	degrees
FDR	Flight Data Recorder
Ft	feet
Hrs	hours
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IIC	Investigator in Charge
IMC	Instrument Meteorological Conditions
Kg	Kilogram(s)
Km	Kilometer(s)
Kts	knots (nm/hours)
min	minute
MOC	Maintenance Organisation Certificate
MTOW	Maximum Take-off Weight
NM	Nautical Mile(s)
PIC	Pilot in Command
Sec	Second(s)
S/N	Serial Number
TSB	Transport Safety Board of Canada
TSN	Time Since New
TSO	Time Since Overhaul
TTIS	Total Time in Service
UTC	Coordinated Universal Time

INTRODUCTION

Investigation AIC 26-1002

On 22 January 2026 at 10:23 (00:23 UTC), Tropicair Limited (Ltd) notified the AIC of an occurrence that involved a DHC-6-300 Twin Otter aircraft, registered P2-BBM, owned and operated by Tropicair Ltd. The aircraft's Nose Wheel Assembly separated from the aircraft after take-off earlier that day at Tapini Airstrip and continued the flight to Jackson's International Airport, Port Moresby, where it subsequently conducted an emergency landing without a Nose Wheel Assembly. The AIC immediately began gathering information pertinent to the occurrence and commenced an investigation pursuant to *Section 247 of the PNG Civil Aviation Act 2000*.

The AIC classified the occurrence as an accident, with the occurrence type categorised as a CTOL: Collision with Obstacle(s) during Take-off and Landing. In accordance with *ICAO Annex 13, Chapter 4, paragraph 4.1*, the AIC promptly notified relevant foreign authorities:

- State of Airframe Design and Manufacture: Transportation Safety Board of Canada (TSB Canada)
- State of Engine Design and Manufacture: Transportation Safety Board of Canada (TSB Canada)

This investigation was conducted, and other States participation was permitted in line with the AIC's Investigation Policy and Procedures Manual, which is fully aligned with *ICAO Annex 13, Chapter 5, paragraph 5.18*.

This Final Report was prepared by the PNG Accident Investigation Commission, P.O. Box 1709, Boroko 121, NCD, Papua New Guinea. It has been authorised for public release by the Commission in accordance with Paragraph 6.5 of the ICAO Annex 13. The report is available on the AIC website at www.aic.gov.pg.

The report is based on the investigation carried out by the AIC under *the Civil Aviation Act 2000*, 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. All times in this report are in local time (UTC+10 hours) unless otherwise stated.

AIC investigations explore the areas surrounding an occurrence, and the facts 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.

In accordance with *ICAO Annex 13*, it is not the purpose of aircraft accident and serious incident investigations to apportion blame or liability. The sole objective of the investigation and the *Final Report* is the prevention of accidents and incidents.

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SYNOPSIS

On 22 January 2026 at 09:33 local time (23:33 UTC), a de Havilland Canada DHC-6-300 aircraft, registered P2-BBM, owned and operated by Tropicair Ltd, was conducting an IFR charter return flight when it experienced a loss of directional control during its take-off roll on Runway 09 (RWY 09), at Tapini Airstrip, Central Province. The aircraft subsequently veered to the left and impacted the perimeter fence adjacent to the left edge of the runway. The Nose Wheel and Lower Fork assembly separated from the Nose Landing Gear (NLG) shock strut assembly after the aircraft became airborne. The aircraft continued to Port Moresby and subsequently conducted an emergency landing at Jacksons International Airport on Runway 32 Left (RWY 32L) without the Nose Wheel and the Lower Fork assembly.

There were twenty-one (21) persons on board the aircraft: Pilot in Command (PIC), co-pilot and nineteen (19) passengers. There were no reported injuries. Prior to departing Port Moresby for Tapini, the crew received information from the Tapini local agent that weather conditions were fine. No significant weather was encountered enroute.

On arrival at Tapini, the aircraft joined the circuit on left base for Runway (RWY) 27. During the final approach, the crew observed that the runway grass had recently been cut and that the runway surface appeared wet and muddy. The crew elected to continue the approach and landed on RWY 27. Following landing, the aircraft was taxied up hill to the western end of the airstrip and parked at the designated parking bay. The engines were shut down, passengers disembarked, and cargo was unloaded.

The crew prepared the aircraft for the return flight to Port Moresby and completed all pre-take-off checks. The aircraft was then taxied to the departure end of RWY 09, where they positioned the aircraft perpendicular to the runway to avoid the risk of sliding when turning onto the runway for a rolling take-off. Following completion of the take-off safety briefing, the pilot initiated the turn onto the runway to commence the rolling take-off. As the aircraft aligned with the runway heading, the crew observed the aircraft begin to slide forward on the wet runway surface. The PIC immediately advanced the power levers to take-off power and held back pressure on the control column as the aircraft rolled forward.

Shortly after the application of take-off power, the aircraft experienced a yaw to the right of the runway heading. In response, the PIC applied corrective control inputs by applying full left rudder and advancing the right power lever. The PIC managed to turn the aircraft back towards the runway heading, however, it overshot the runway heading and began to track to the left. The PIC once again applied corrective control inputs which included rudder, nose wheel steering (tiller) and asymmetric power in an attempt to arrest the left drift and to maintain runway alignment. Despite these actions, directional control was lost and the aircraft departed the prepared runway surface, entering overgrown vegetation and impacting a section of the airstrip perimeter fencing.

The aircraft subsequently regained runway heading momentarily then turned right towards the runway before becoming airborne, approximately 30 seconds after commencement of the take-off roll, having travelled approximately 350 metres.

During the cruise phase, the crew were advised by their company that the aircraft's nose wheel had separated from the aircraft during the take-off. Following this notification, the crew continued the flight to Jacksons International Airport and conducted an emergency landing on RWY 32L without the nose wheel and the lower fork assembly. The aircraft subsequently came to rest on the runway.

The nose wheel fork fractured at the axle, resulting in separation of the nose wheel assembly from the aircraft during the take-off sequence at Tapini Airstrip. The aircraft's nose wheel and tyre assembly, the left leg of the nose fork and its axle, were located adjacent to the Tapini Airstrip runway. The fractured fork and oleo assembly remained attached to the aircraft. During the runway excursion at Tapini, the left wingtip entered the vegetation, resulting in grass becoming lodged in the wingtip area and

remaining there throughout the return flight. The damaged nose landing gear assembly sustained additional substantial damage during the emergency landing at Jacksons International Airport.

The occurrence was influenced by a combination of environmental, aerodrome/infrastructure, and human factors. Environmental factors included the wet, muddy, and slippery runway conditions following heavy overnight rainfall. Aerodrome and infrastructure factors included the 4.5% downhill gradient, lateral slope of RWY 09, and inadequate drainage at Tapini Airstrip, which allowed water to accumulate and further degrade the runway surface. Human factors included the pilot's control inputs and actions in attempting to mitigate the developing loss of control. These factors contributed to the loss of braking effectiveness, steering control, and tyre traction, which ultimately resulted in a loss of directional control during the take-off roll.

The investigation determined that the PIC applied significant steering inputs in an attempt to regain directional control. Under the prevailing low-friction conditions, these inputs likely contributed to increased stresses on the nose wheel assembly.

As the aircraft continued to skid left, it entered the overgrown vegetation (grass area) adjacent to the runway and impacted the perimeter fencing. The nose wheel became entangled with barbed and mesh wire, which was torn from the fence posts and wrapped around the nose wheel fork and oleo assembly. As the aircraft yawed to the right while continuing to drift left, the trailing wire was likely overrun by the right main landing gear, generating an additional tensile load on the nose wheel assembly.

During the recovery attempt, the nose wheel assembly was subjected to substantial loading as the aircraft continued skidding and steering inputs were applied to regain runway alignment. This loading initiated overload fractures in the nose wheel fork. The additional loading imposed by the entangled fence wire caused the remaining material to fail, resulting in separation of the nose wheel assembly shortly after lift-off.

On 13 May 2026, Tropicair Limited provided the Accident Investigation Commission (AIC) with evidence of safety actions implemented voluntarily following the occurrence. These actions included conducting a risk assessment of operations at Tapini Airstrip, enhancing weather observation and runway condition reporting through training and installation of a rain gauge, reviewing operating procedures for wet and sloping remote airstrips, and improving runway drainage and vegetation management to reduce water accumulation and enhance operational safety at Tapini Airstrip.

In accordance with *ICAO Annex 13 Standards and Recommended Practices*, the purpose of the investigation was not to apportion blame or liability, but to identify safety issues and promote the prevention of future accidents and incidents. The investigation report contains the factual information, analysis, findings, contributing factors, and safety recommendations.

1. FACTUAL INFORMATION

1.1 History of the Flight

Aircraft Registration	P2-BBM
Owner	Tropicair Limited
Operator	Tropicair Limited
Type of Operation	IFR Charter Operations
Persons on Board	21 (2 Crew and 19 Passengers)
Location¹ of Accident Site	Tapini Airstrip, Central Province, Papua New Guinea Latitude: 8° 21' 24"S, Longitude 146° 59' 21"E
Elevation	3,000Ft / 914m AMSL
Time of Accident	09:33 local time (23:33 UTC ²)

Table 1. Accident Summary.

On 22 January 2026 at 09:33 local time (23:33 UTC), a de Havilland Canada DHC-6-300 aircraft, registered P2-BBM, owned and operated by Tropicair Ltd, was conducting an IFR charter return flight when it experienced a loss of directional control during its take-off roll on Runway 09 (RWY 09), at Tapini Airstrip, Central Province. The aircraft subsequently veered to the left and impacted the perimeter fence adjacent to the left edge of the runway. The Nose Wheel and Lower Fork Assembly separated from the Nose Landing Gear (NLG) shock strut assembly after the aircraft became airborne. The aircraft continued to Port Moresby and subsequently conducted an emergency landing at Jacksons International Airport on Runway 32L without the Nose Wheel and the Lower Fork Assembly.

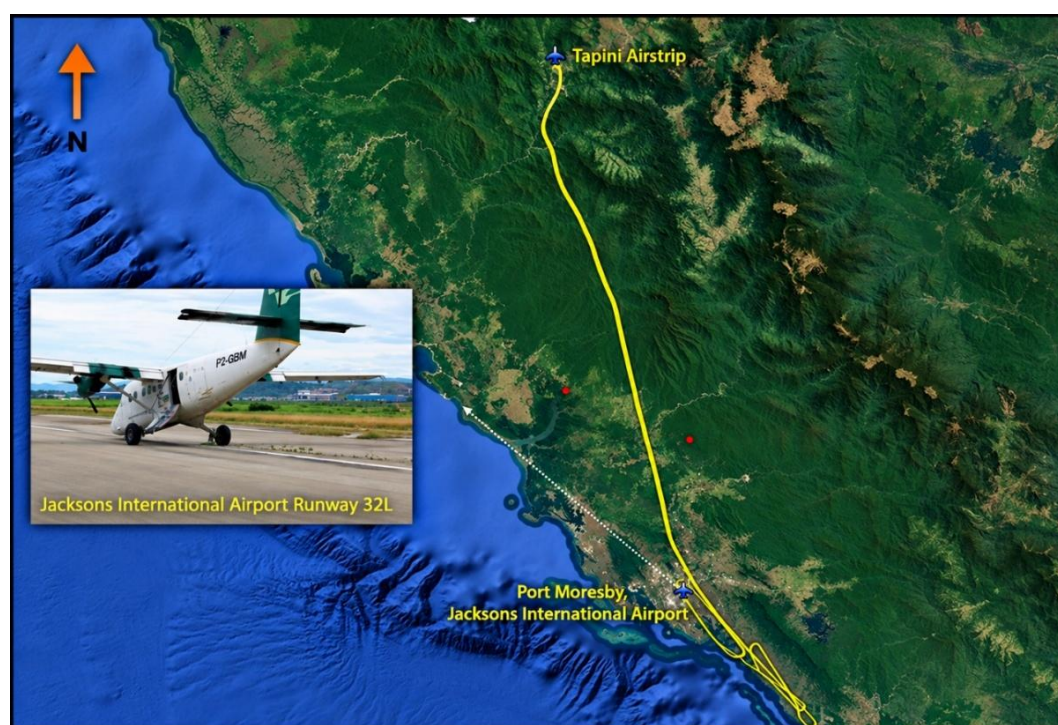


Figure 1. Flight Path from Tapini Airstrip, Central Province to Jacksons International Airport, Port Moresby.

¹ The location of the occurrence is the place where the significant event took place and resulted in damage to the aircraft, thereby meeting the criteria for classification as an accident.

² 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 occurrence, Papua New Guinea Time (Pacific/Port Moresby Time) is UTC +10 hours.

There were twenty-one (21) persons on board the aircraft: Pilot in Command (PIC), co-pilot and nineteen (19) passengers. There were no reported injuries.

Prior to departing Port Moresby, the crew stated that they received information from the local agent on the ground at Tapini that the weather was fine.

Recorded data³ showed that the aircraft departed Jacksons International Airport at about 08:28 local time, climbed to about 8,000 feet (ft) above mean sea level (AMSL) and tracked northwest to Tapini. No significant weather was encountered enroute, and the flight crew continued the flight to Tapini.

1.1.1 Arrival at Tapini Airstrip

At about 09:03, the aircraft (BBM) arrived at Tapini. The recorded flight data and flight crew's statement indicated that the aircraft joined the circuit area on left base for RWY 27. During the final approach, the flight crew stated that they observed that the runway grass had recently been cut and that the runway surface appeared wet and muddy. They elected to continue the approach and landed on RWY 27.

After landing, the aircraft was taxied up slope to the western end of the airstrip and parked at the designated parking bay. The engines were shut down, passengers disembarked and cargo unloaded.

The flight crew also stated that, while on the ground, they spoke with the local people regarding the weather conditions prior to their arrival. The locals advised that the area had experienced heavy rainfall the previous night.

Following the completion of passenger boarding and cargo loading for the return flight to Port Moresby, the crew commenced the pre-departure preparations.

1.1.2 Departure from Tapini Airstrip

The crew prepared the aircraft for the return flight to Port Moresby and completed all pre-take-off checks. The aircraft was then taxied to the departure end of RWY 09, where they positioned the aircraft perpendicular to the runway to avoid the risk of sliding when turning onto the runway for a rolling take-off.

Recorded data showed that at 09:33, following completion of the take-off safety briefing, the pilot initiated the turn onto the runway to commence the rolling take-off. As the aircraft aligned with runway heading, the crew observed the aircraft begin to slide forward on the wet runway surface. The PIC immediately advanced the power levers to take-off power and held back pressure on the control column as the aircraft rolled forward.

Tyre and ground imprints observed by the on-site investigation team indicated that the aircraft was initially aligned with the runway before sliding on the wet runway surface. (Refer to Section 1.12 for a detailed description of the aircraft's ground track).

Recorded data also showed that shortly after the application of take-off power, the aircraft yawed to the right of the runway heading. The PIC managed to turn the aircraft left, back onto runway heading. However, it overshot the runway heading and continued to track to the left, resulting in a loss of directional control. Despite further control inputs, including full nose wheel steering (Tiller), the aircraft departed the prepared runway surface and entered overgrown vegetation on the left side of the runway edge.

The recorded data then showed the aircraft's heading straighten, returning to align with the runway heading of 090°, before it turned further to the right, towards the runway. The aircraft became airborne approximately 30 seconds after commencing the take-off roll, having travelled approximately 350 metres (m) down the strip.

³ The recorded data from the Appareo AIRS-400. For further details, see section 1.11

The aircraft continued to climb, clearing the vegetation and tracked to the right as it passed beyond the end of the runway, and towards the valley. At 09:34 the flight crew configured the aircraft for the cruise phase of the flight back to Port Moresby.

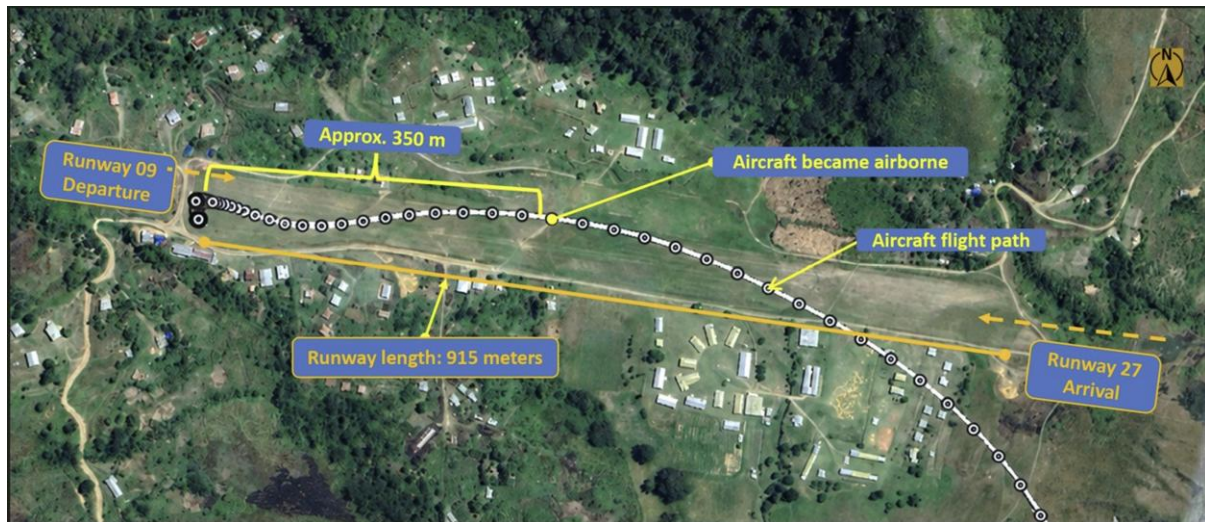


Figure 2. Overview of P2-BBM Take-off roll sequence at Tapini Airstrip.

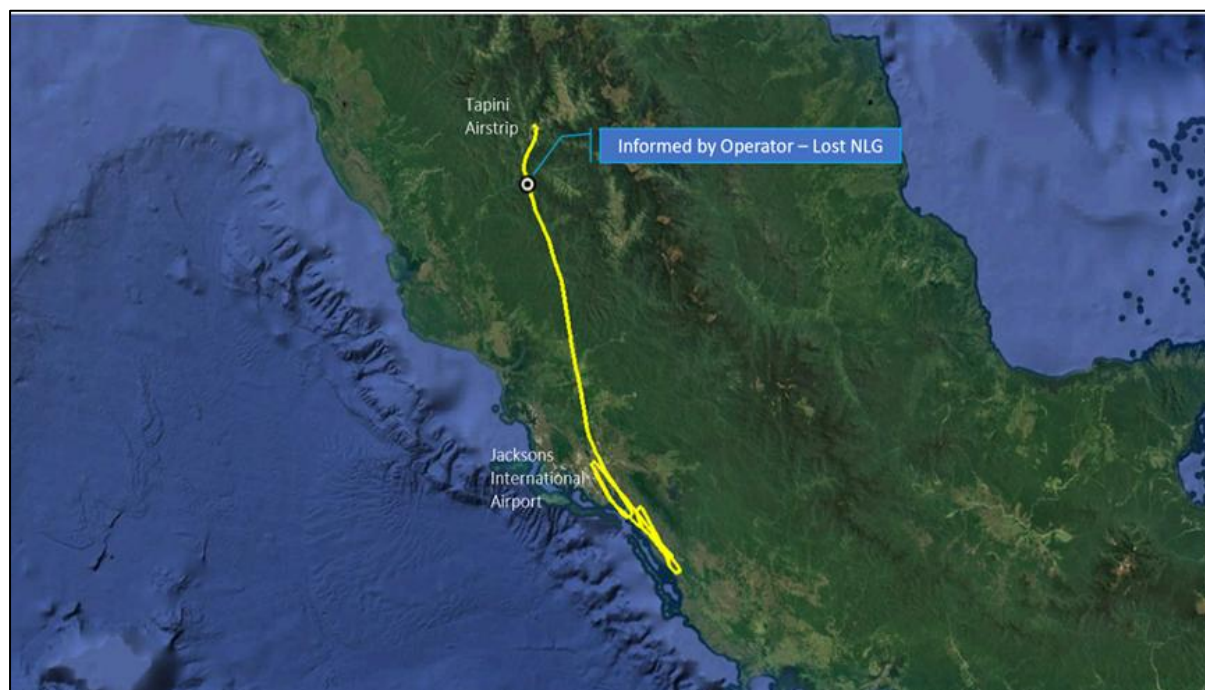


Figure 3. P2-BBM on return flight to Port Moresby, informed in cruise of the of detached Nose Wheel Assembly.

According to the flight crew, during the cruise phase, they were advised by their company through Air Traffic Services, (ATS) that the aircraft's nose wheel assembly had separated from the aircraft during the take-off at Tapini Airstrip. Following this notification, they continued with the flight to Jacksons International Airport.

1.1.3 Return Flight and Emergency Landing at Jacksons International Airport

Recorded data showed that at 09:36, the aircraft tracked a southwesterly heading and continued to climb to the planned cruising altitude of 9,000 ft AMSL.

At 09:52, the crew contacted Jacksons Radar and advised that they were 25 NM from the aerodrome, maintaining 9,000 ft, and established on the 343 radial. Jacksons Radar subsequently advised the crew to expect a visual approach for right base RWY 32L.

At 09:55, Jacksons Radar instructed the crew to descend to 7,000 ft and to report when 15 NM. The crew also advised Jacksons Radar that they required a fly-past of the control tower to visually check the landing gear. Two minutes later, the crew advised Jacksons Radar that they were 10 NM from the aerodrome, descending through 7,000 ft and in visual conditions. Jacksons Radar cleared the crew to track for a mid-right downwind for RWY 32L.

At 10:00, Jacksons Radar cleared the aircraft to descend to 4,000 ft in visual conditions, and four minutes later, instructed the crew to contact Jacksons Tower on 118.1 MHz.

At 10:04, the crew established contact with Jacksons Tower and reported that they were 9 NM from the aerodrome. One minute later, the crew requested a fly-past of the control tower for a visual inspection of the nose landing gear and was subsequently cleared to conduct the fly-past.

At 10:11, Jacksons Tower advised the crew that there appeared to be only two wheels down and there was no nose wheel. At 10:12, Jacksons Tower cleared the aircraft to conduct a right circuit for RWY 32L.

At 10:15, the crew declared a PAN PAN⁴ and requested that emergency services be on standby. Jacksons Tower advised that full AEP⁵ had been activated and that all emergency services were on standby.

Following this confirmation, at approximately 10:17, Jacksons Tower instructed the crew to track inland from the coast, remain east of the centerline, and hold at 2,000 ft. Jackson Tower advised the crew that the full Aerodrome Emergency Response Procedures had been activated while the aircraft remained in the holding area.

The aircraft was held for approximately 30 minutes in an area 10 to 25 NM southeast of Jacksons International Airport.

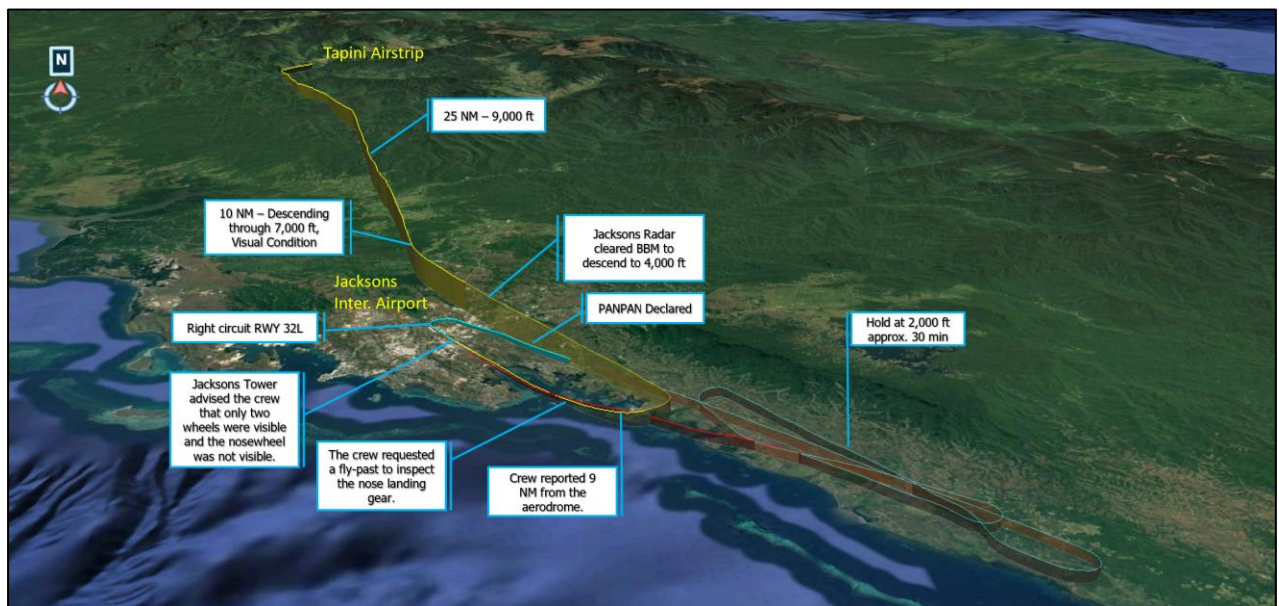


Figure 4. P2-BBM's Emergency Landing Phase at Jacksons International Airport.

Once the emergency response arrangements were in place, the crew was cleared to commence an approach and land on RWY 32L. The aircraft subsequently returned to Jacksons International Airport and conducted an emergency landing, coming to a stop RWY 32L. Subsequently, the remaining lower section of the nose landing gear oleo collapsed, and the aircraft sustained further substantial damage to the remaining components of the nose landing gear assembly.

⁴ PAN is an international radio distress transmission and denotes urgency but not life-threatening danger.

⁵ Aerodrome Emergency Procedure

After the aircraft came to rest, the crew shut down the aircraft and conducted the evacuation of all passengers.

Once the passengers had exited, the crew disembarked from the aircraft.



Figure 5. P2-BBM after the emergency landing on RWY 32L at Jacksons International Airport.

1.2 Injuries to Persons

INJURIES	Crew	Passengers	Total in aircraft	Others
Fatal	0	0	0	—
Serious	0	0	0	—
Minor	0	0	0	Not applicable
None	2	19	21	Not applicable
TOTAL	2	19	21	—

Table 2. Injuries to Persons.

1.3 Damage to Aircraft

The aircraft sustained substantial⁶ damage to the nose landing gear assembly. The nose wheel, tyre, wheel hub, axle/fork assembly, and associated lower fork components separated from the nose landing gear assembly during the take-off sequence at Tapini Airstrip. The detached nose wheel assembly was subsequently recovered at Tapini by the locals.

⁶ The ICAO Annex 13 definition states that substantial damage is damage:

"...which adversely affects the structural strength, performance or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component..."

In this case:

- The damaged NLG Assembly cylinder required replacement of a major landing gear component.
- These repairs involved maintenance before the aircraft could be released to service.

This is consistent with the Annex 13 threshold for substantial damage, provided the damage adversely affected the aircraft's structural strength, performance, or flight characteristics which damage to the nose landing gear assembly would reasonably do until repaired.

Refer to Section 1.12 for a detailed description of damage to the aircraft.

1.4 Other damage

1.4.1 Tapini Airstrip

During the take-off roll, the aircraft veered off the left side of the airstrip and impacted the perimeter fence, resulting in the severing of the barbed and mesh wire fence and dislodging of associated fence posts.

Refer to Section 1.12.

1.4.2 Jacksons International Airport, Port Moresby

During the emergency landing on RWY 32L, the exposed nose landing gear oleo contacted the asphalt surface and caused a ploughing effect. The distance between the initial ground contact mark and the aircraft's final stopping position was 87.2 m.

Refer to Section 1.12.

1.5 Personnel Information

1.5.1 Pilot in Command

Age	:	71 years
Gender	:	Male
Nationality	:	Australian
Type of licenses	:	PNG ATPL (A) (Aeroplane)
Type endorsements	:	SEAL: <5,700Kg MTOW; C180/182/185; C205/206/207; C208; PAC 750XL MEAL: BN2, BN2T; PA23; PA31; PA60; C401; BE65; BE20; BE20; DHC-6
Total flying time	:	26,891.7 hours
Total on this type	:	2,788.8 hours
Total hours last 30 days	:	89.9 hours
Total hours last 7 days	:	24.9 hours
Last Line Check incl Route Check (DHC-6-300)	:	14 February 2025
Last Base /Competency Check (BE20)	:	30 December 2025
Medical class	:	One
Issued	:	25 August 2025
Valid to	:	17 March 2026
Medical limitation	:	Spectacle required to be worn

Table 3. PIC Personnel Information.

Training records for the PIC indicated that a Flight Proficiency Line Check was completed on 14 February 2025 on a Beechcraft BE20 aircraft, incorporating pilot-in-command knowledge requirements and route and aerodrome competency requirements applicable to PNG Civil Aviation Rule (CAR) Parts 125 and 135 operations. A Crew Member Emergency Proficiency Test was completed on 31 July 2025.

At the time of the occurrence, the PIC held a current IFR Base/Competency Check, completed on 30 December 2025 on a Beechcraft B200 aircraft. The check incorporated IFR base check requirements applicable to both captain and co-pilot roles and was conducted on a six-monthly cycle.

The PICs logbook also showed that he last operated into Tapini on a DHC-6-300 on 1 January 2026.

1.5.2 Co-pilot

Age	:	30 years
Gender	:	Male
Nationality	:	Papua New Guinean
Position	:	Co-pilot
Type of licenses	:	PNG CPL(A) (Aeroplane)
Type Endorsements	:	SEAL: C152, C172, C206, Y12, BN-2A, DHC-6 MEAL: P2006T
Total flying time	:	1,110.8 hours
Total on this type	:	925.4 hours
Total hours last 30 days	:	62.2 hours
Total hours last 7 days	:	11.3 hours
Last Line Check incl Route Check (DHC-6)	:	26 August 2025
Last IFR Base/Competency Check (DHC-6)	:	10 September 2025
Medical class	:	One
Issued	:	16 October 2025
Valid to	:	16 April 2026
Medical limitation	:	Vision correction required ⁷

Table 4. Co-pilot Personnel Information.

Training records indicated that the co-pilot had completed training and competency assessments in accordance with the operator's Training and competency requirements and (CAR) Part 61.807 – Currency Requirements for the Holder of an Instrument Rating, and CAR Part 125.605 – Flight Crew Competency Checks.

DHC-6-300 IFR Base/Competency renewal check was completed on 10 September 2025 and current at the time of the occurrence. The co-pilot also completed a Crew Member Emergency Proficiency Test on 10 September 2025.

Flight Proficiency Line Check was completed on 26 August 2025 on a DHC-6-300 aircraft type.

The co-pilot's logbook showed that he had last operated into Tapini on a DHC-6-300 on 13 January 2026.

Although the co-pilot had completed the DHC-6-300 training and competency requirements, it was noted that the flight crew licence presented during the investigation did not contain a recorded DHC-6 aircraft type endorsement.

1.6 Aircraft Information

The de Havilland Aircraft of Canada Ltd, DHC-6 Series 300 Twin Otter is an all-metal, high-wing monoplane. It is equipped with a fixed tricycle landing gear configuration, featuring a steerable nose wheel. The flight control system consists of a conventional three-control setup, consisting of dual side-by side rudder pedals and control column combination with a steering tiller attached on the left control column yoke.

⁷ Appareo cockpit video showed that on the day of the accident, the co-pilot wore his spectacles.

The aircraft is powered by two wing-mounted Pratt and Whitney, PT6A-34 turboprop engines, each driving a three-bladed, reversible pitch, fully feathering propeller.

The aircraft is certified to accommodate up to 19 passengers, depending on the specific seating configurations.

1.6.1 Aircraft

Aircraft manufacturer	:	de Havilland Aircraft of Canada
Model	:	DHC-6-300
Serial number	:	542
Year of manufacture	:	1977
Nationality of State of Manufacture	:	Canada
Nationality of State of Registration	:	PNG
Registration	:	P2-BBM
Name of the owner	:	Tropicair Limited
Name of the operator	:	Tropicair Limited
Certificate of Airworthiness number	:	356
Certificate of Airworthiness issued	:	12 February 2025
Valid to	:	non-terminating
Certificate of Registration number	:	356
Certificate of Registration issued	:	12 February 2025
Valid to	:	non-terminating
Total airframe hours	:	7,905
Total airframe landings	:	8,794

Table 5. Aircraft data.

1.6.2 Engine

Manufacturer	:	Pratt & Whitney Canada Inc.
Type	:	PT6A-34
Engine Type	:	Turboprop
Position	:	Left
Serial No.	:	PCE-RB0793
Position	:	Right
Serial No.	:	PCE-RB0749

Table 6. Engine data.

Engine hours and cycles were not relevant to this investigation.

1.6.3 Propeller

Manufacturer	:	Hartzell Propeller Inc.
Type	:	HC-B3TN-3D
Propeller Type	:	Hydraulically controlled, three-blade, constant speed, fully reversing and fully feathering
Position	:	Left
Serial No.	:	BUA-24443
Position	:	Right
Serial No.	:	BUA-21245

Table 7. Propeller data.

Propeller hours and cycles were not relevant to this investigation.

1.6.4 Airworthiness and Maintenance

At the time of the accident, P2-BBM had a valid Certificate of Airworthiness (CoA) and Certificate of Annual Airworthiness Review (AAR).

The aircraft's maintenance records were reviewed during the investigation. The review identified no outstanding scheduled maintenance, recorded defects, or deferred Minimum Equipment List (MEL) items at the time of the accident.

The aircraft had been certified as airworthy and serviceable when dispatched for the flight.

1.6.5 Aircraft Weight and Balance

A review of the aircraft weight and balance data indicated that the flight was conducted within the approved weight and centre of gravity operating limitations.

1.7 Meteorological Information

Papua New Guinea has considerable regional variability in rainfall. The Australian Bureau of Meteorology and CSIRO (2014) reported that rainfall patterns in Papua New Guinea are influenced by the West Pacific Monsoon, while year-to-year variability is influenced by the El Niño–Southern Oscillation (ENSO). A broad wet season from November to April and a drier period from May to October are recognised in parts of southern Papua New Guinea.

Tapini is located in the mountainous interior of Central Province at an elevation of approximately 3,000 ft. Available climatic data indicates that January is one of the wetter months at Tapini, with average monthly rainfall of approximately 315 mm and rainfall occurring on approximately 25 days during the month.

1.7.1 PNG National Weather Service Area Forecast for Area 2

The area forecast for Central Papua, Kerema and Port Moresby (Area 2) was valid from 21 January 23:00 UTC to 22 January 11:00 UTC.

Winds at different levels			
Level	Wind Direction		
2,000 ft	280 degrees at 30 kts		
5,000 ft	270 degrees at 35 kts		
7,000 ft	270 degrees at 35 kts		
10,000 ft	280 degrees at 30 kts		
14,000 ft	290 degrees at 30 kts		
Cloud information			
Scattered cumulonimbus between 1,800 ft and 45,000 ft			
Broken stratus between 500 ft and 3,000 ft in precipitation			
Scattered cumulus between 1,500 ft and 10,000 ft, showers			
Scattered stratocumulus between 3,000 ft and 8,000 ft in broken rain and drizzle			
Visibility			
3,000 m in thunderstorms and rain, 3,000 m in rain showers and rain, rain drizzle			
Weather			
Scattered showers and isolated thunderstorms and rain in area			

Table 8. Area Forecast for Area 2.

1.7.2 PNG National Weather Service Terminal Aerodrome Forecast

The Moresby Terminal Aerodrome Forecast (TAF) 2 issued by the National Weather Service was valid from 22 January 2026, 22:00 UTC to 00:00 UTC on 22 January 2026.

Terminal Aerodrome Forecast (TAF)			
Wind	Wind Direction		
Visibility	280 degrees at 30 Kts		
Clouds	270 degrees at 35 Kts		
FROM 0900 UTC			
Wind	320 degrees at 12 Kts		
Visibility	Greater than 10 Km with broken cloud		
INTER PERIOD from 0400 UTC to 0800 UTC			
Visibility	4000 m in showers and rain		
Cloud	Broken at 1000 ft		
TEMPERATURE			
26	25	28	30
QNH ⁸			
1007	1006	1004	1005

Table 9. Terminal Aerodrome Forecast (TAF) – AYPY.

1.7.3 Reported Weather: Pilot

Weather information for Tapini was obtained prior to departure from Port Moresby through the Operator's ground personnel who sourced the details from a local contact at Tapini. The information relayed to the crew indicated that weather conditions at Tapini was fine.

The flight to Tapini was planned for 10,000 ft. The crew reported that during the flight, the visibility was sufficient to see the surrounding mountain tops, and the flight was conducted at 8,000 ft instead of the planned 10,000 ft. On arrival and during the approach, the PIC described the weather as "smooth, clear,

⁸ The QNH are at four (4) hour intervals

still, with little or no wind". At the time of departure from Tapini, the weather was again described as good, with no significant wind and only high overcast cloud.

The PIC informed the investigators that the weather at the time of departure from Tapini was reported as good, with no significant abnormal weather conditions.

Furthermore, the PIC stated that locals on the ground reported that heavy rain had occurred during the previous night. This was consistent with the muddy, wet and slippery condition of the airstrip observed by the flight crew during landing and take-off at Tapini Airstrip.

1.8 Aids to Navigation

Ground-based navigation aids, on-board navigation aids, and their serviceability were not a factor in this accident.

1.9 Communication

All communication between Air Traffic Services (ATS) and the crew were normal and did not contribute to this accident.

1.10 Aerodrome Information

1.10.1 Tapini Airstrip

Parameter	Details
Airstrip	Tapini
ICAO Location Indicator	AYTI
Length	915 m
Elevation	3,000 feet
Slope	4.5% down to East
Runway Direction	09 (086°) / 27 (266°)
Cautions	Land strip 27 only. Take-off strip 09 only. Airstrip can become very slippery after rain.
Surface	Grassed red clay

Table 10. Tapini Airstrip Data (Source: Tropicair DHC-6 Route Guide).

1.10.1.1 Crew Observation

The crew reported that, during the approach to Tapini Airstrip, the runway surface condition could not be visually assessed until the aircraft was established on the final approach for RWY 27. At that stage, the aircraft had passed the crew's identified committed point for the approach. The crew then observed that the grass on the runway had recently been cut, and that visible tractor tracks were present along the strip, consistent with recent grass-cutting activity.

The crew stated that information obtained prior to departure from Port Moresby was generally limited to weather conditions and did not include runway surface conditions information.

The PIC stated that the lower section of RWY 27 appeared "wetter and boggy" than the upper section (RWY 09). Based on this assessment, the crew elected to continue the landing and park at the upper section of RWY 09 (parking bay) where the surface appeared comparatively drier.

The aircraft was parked at an angle across the strip, rather than aligned downhill, to reduce the risk of the aircraft sliding on the wet surface.



Figure 6. Tapini Airstrip.

The co-pilot reported that after disembarking at Tapini, he conducted a walk-around inspection of the aircraft and that his footwear became covered in mud up to ankle level.



Figure 7. Strip surface conditions and tractor's tyre marks at Tapini Airstrip on the day of the accident.

1.10.1.2 Jacksons International Airport (AYPY)

RWY 32L is the secondary runway at Jacksons International Airport and has a landing distance of 1,300 m. The aircraft landed on RWY 32L and came to a stop 87 m from touch down point.

The Airport Rescue and Fire Fighting (ARFF) services were on standby at the Taxiway Foxtrot junction, while other emergency services were positioned in the grassed area near Taxiway Kilo.

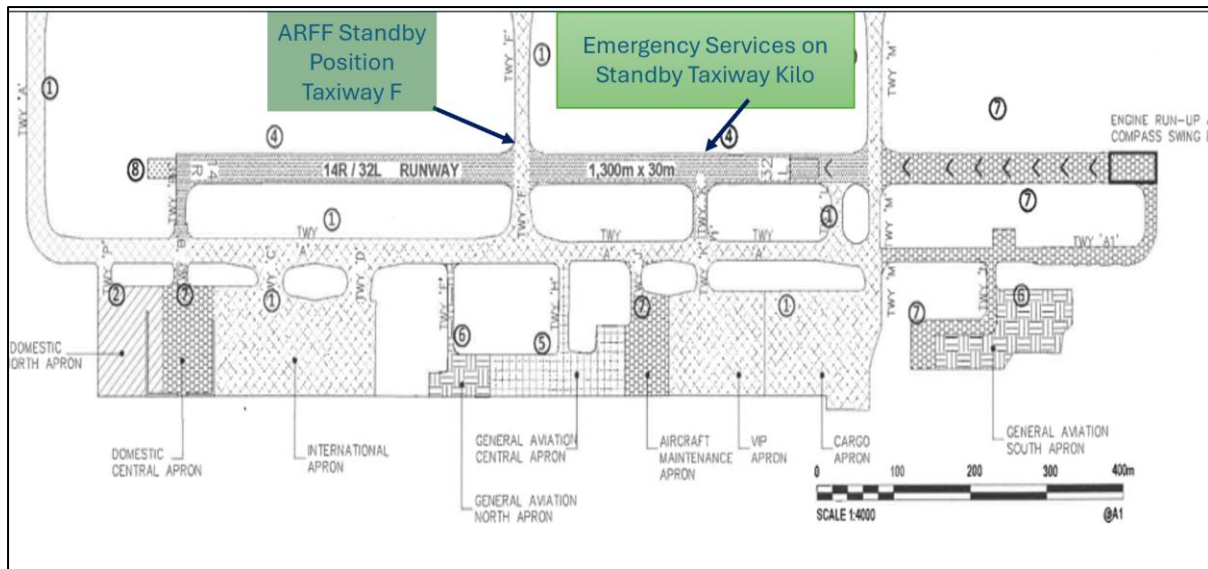


Figure 8. RWY 32L, Jacksons International Airport, Port Moresby (AYPY) – Source: PNG Aeronautical Information Publication (AIP)

1.11 Flight Recorders

The aircraft was fitted with an L3Harris FA5000 Solid-state recorder.

Attempts to download recorded data from the Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) were unsuccessful. Consequently, the investigation relied on data recorded by the Appareo AIRS 400 unit.

1.11.1 Other Electronic Data Recording Device

The aircraft was fitted with an Appareo AIRS 400 recorder for flight data monitoring purposes. The unit captured the following information: cockpit image recording, intercom system audio for crew, air traffic control (ATC) communications and WAAS GPS (latitude, longitude, groundspeed, vertical speed, GPS altitude, etc), Attitude data (G forces) and rates of rotation. The unit has an SD card for storing recorded information. Data from the SD Card was successfully extracted and included recordings from the accident flight.

A witness at Tapini recorded the aircrafts take-off, capturing the aircraft throughout the take-off roll and departure from the Tapini circuit area. The witness video, together with the Appareo flight data and airborne image recordings were analysed to support the investigation.

1.12 Wreckage and Impact Information

1.12.1 General Description of the Accident Site – Tapini Airstrip

Photographs and ground evidence indicated that, during the take-off roll from Tapini Airstrip on RWY 09, the aircraft initially tracked along the grassed strip before deviating from the intended take-off path.

The airstrip surface was wet, muddy, and slippery, with multiple tyre marks and areas of disturbed grass and soil observed along the aircraft's ground track.

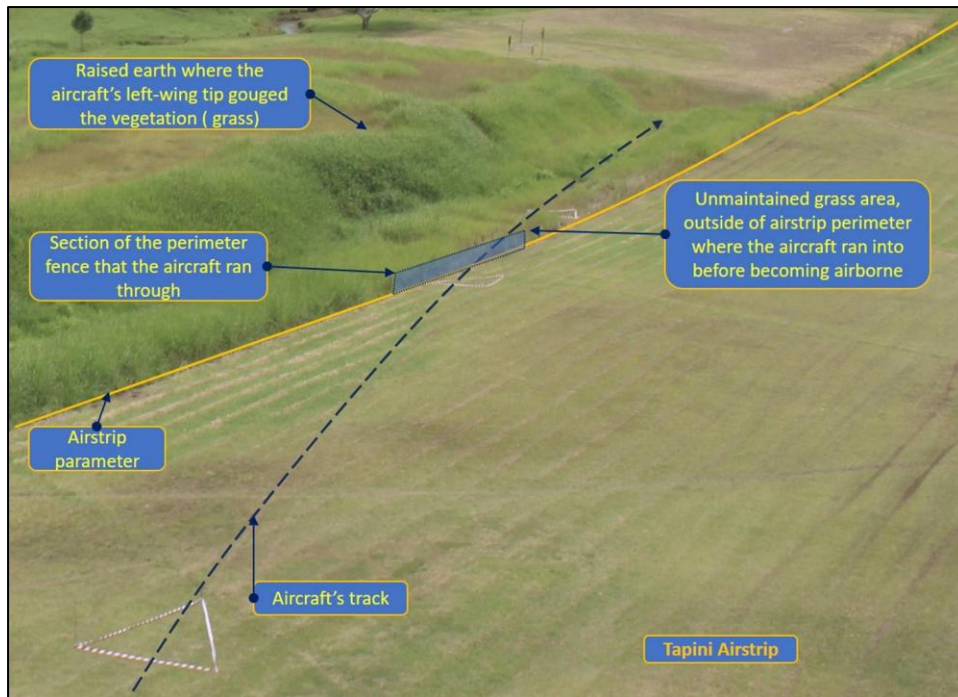


Figure 9. Tyre Markings as it tracked along RWY 09 and entered the overgrown vegetation at the runway strip edge.

Tyre marks were observed curving laterally across the runway surface toward the left side of the maintained strip and continuing into vegetation adjacent to the airstrip perimeter. Ground disturbance in this area was consistent with the landing gear traversing soft, wet ground beyond the maintained runway surface.



Figure 10. Overview of P2-BBM track along RWY 09 - Tapini Airstrip.

1.12.2 Wreckage Distribution and Recovery

After departing the left side of the strip, the aircraft entered long vegetation and a drainage area adjacent to the runway at the airstrip perimeter. During this sequence, the left wingtip contacted elevated terrain at the airstrip edge, resulting in vegetation (grass) becoming lodged in the wingtip. The vegetation remained lodged in the wingtip during the subsequent flight to Port Moresby.



Figure 11. Vegetation (grass) lodged in the left wing-tip of P2-BBM.

Barbed wire, mesh wire and vegetation were also found lodged around the remaining nose landing gear structure and right main landing gear, consistent with the aircraft having passed through the airstrip perimeter fencing. During the impact with the airstrip perimeter fence, approximately 16 m of barbed wire became entangled around the right main landing gear assembly and remained attached to the aircraft throughout the subsequent flight to Port Moresby.

The nose wheel assembly, including the tyre and associated fork/axle components, was later located and recovered at Tapini. The condition of the recovered wheel and fork components was consistent with separation of the lower nose landing gear assembly before the aircraft continued flight to Port Moresby.



Figure 12. Vegetation (grass) barbed and mesh wire lodged on the Right Main Landing Gear (MLG) of P2-BBM at Jackson International Airport.

1.12.3 Nose Landing Gear Assembly Examination

An on-site examination of the recovered lower fork assembly showed that it had fractured and separated from the nose landing gear shock strut assembly. The separated components comprised the nose wheel and tyre assembly, the left leg of the nose and its axle.

A further examination of the recovered fork assembly at the AIC's Engineering Facility identified fracture surfaces, local deformation, paint transfer and paint loss, mud contamination, and ground contact marks.

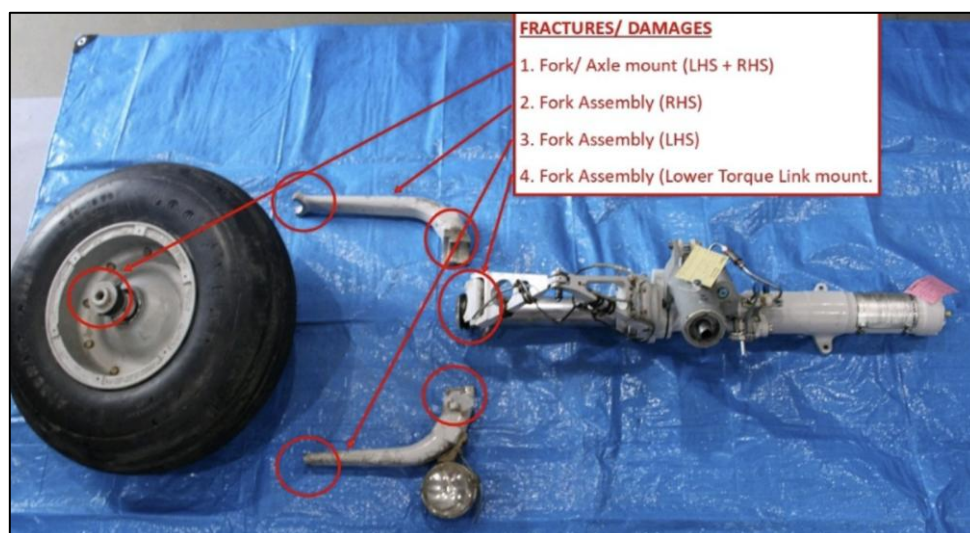


Figure 13. Examination of the Nose Landing Gear Components at the AIC Engineering Facility.

1.12.4 Jacksons International Airport emergency landing

The aircraft continued to Jacksons International Airport without the nose wheel and lower fork assembly. During the emergency landing on RWY 32L, the aircraft initially touched down on the main landing gear. As the aircraft decelerated, the nose lowered, and the exposed lower end of the remaining nose landing gear fork and strut (oleo) contacted the runway surface. The aircraft subsequently slid on the exposed nose landing gear structure for approximately 87 m before coming to rest on the RWY 32L.



Figure 14. P2-BBM track on RWY 32L - Jacksons International Airport, Port Moresby (AYPY).

At its final resting position, the aircraft remained upright. The aircraft was supported by both main landing gear assemblies, while the forward fuselage was supported by the exposed lower end of the remaining nose landing gear shock strut in direct contact with the runway surface.

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were they required.

1.14 Fire

There was no evidence of pre or post-impact fire.

1.15 Survival Aspects

The accident was survivable.

The pilot stated that after the aircraft came to rest, he shut down the engines, exited the aircraft, and opened the passenger door to assist in the disembarkation of the passengers. He further stated that, as there was no post-impact fire or other imminent danger, a normal disembarkation was carried out.

1.16 Tests and Research

In accordance with ICAO Annex 13, Standard 5.23, the AIC requested the Australian Transport Safety Bureau (ATSB) to assist the investigation by conducting a material failure analysis of the affected components.

The fractured sections of the nose landing gear assembly were sent to the ATSB Material Failure Analysis Facility in Canberra for detailed examination. AIC representatives were present during the examination.

ATSB's metallurgical examination identified evidence of predominantly ductile overstress on the fracture surfaces in the crown region and axle attachment points of the nose landing gear. The examination did not reveal any evidence of fatigue cracking, nor was there any pre-existing or manufacturing defects found that might have otherwise contributed to the failure.

Based on the examination findings and other evidence gathered during the investigation, the investigation determined that the fracture resulted from impact damage when the nose landing gear struck the barbed and mesh wire fence as the aircraft tracked through vegetation (grassy area) adjacent to the airstrip.

1.17 Organisational and Management Information

1.17.1 The Operator: Tropicair Limited

Tropicair Limited (PNG) is headquartered in the National Capital District, Port Moresby, Papua New Guinea, where its principal maintenance facility is also located. The company conducts domestic and international operations as authorised by CASA PNG.

At the time of the serious incident, the operator held Air Operator Certificate (#AOC) 119/015, issued on 24 November 2023 and effective from 30 November 2023 to the end of 30 November 2028.

The AOC was issued pursuant to Section 47 (3) and 49 of the Civil Aviation Act 2000 and Civil Aviation Rule Part 119. It authorised Tropicair Limited to conduct commercial air operations in accordance with its approved Operations Specifications and Company Exposition.

The operator also held Maintenance Organisation Certificate (#MOC) 145/015, issued on 01 June 2024 and effective from 01 June 2024 until 31 May 2027. In addition to its approved maintenance organisation, the company also contracted authorised maintenance organisations to perform maintenance on its aircraft, as required.

1.17.2 Tapini Airstrip Operational Environment and Runway Condition Risks

The operator relied primarily on informal weather reporting from local personnel at Tapini prior to dispatch. Although weather information was obtained before departure, no formal runway surface condition assessment or reporting process was available to provide the flight crew with accurate information regarding runway contamination or slipperiness.

The absence of a formal runway condition reporting system reduced the crew's ability to accurately assess operational risk prior to departure from Port Moresby. Information available to the crew was limited to general weather advice that conditions at Tapini were "good," despite the runway reportedly being affected by overnight rainfall.

The investigation identified that remote airstrip operations within Papua New Guinea present operational challenges associated with limited infrastructure, reduced maintenance capability, and environmental exposure during wet-season operations. These conditions may affect runway surface integrity, drainage, vegetation growth, and hazard management.

Vegetation overgrowth was present adjacent to the runway strip, including areas where fencing and barbed wire were located near the runway strip edge. During the occurrence sequence, the aircraft contacted vegetation and the airstrip perimeter fencing after departing the maintained runway surface.

The investigation also identified limitations associated with runway surface maintenance and monitoring at remote airstrips during prolonged wet weather periods. Recently cut grass and visible tractor tyre tracks indicated ongoing maintenance activity; however, the runway surface remained significantly degraded and slippery at the time of the occurrence.

The operational characteristics of Tapini Airstrip also represented an inherent systemic risk. The one-way-in, one-way-out profile, sloping terrain, and limited rejected take-off or go-around options reduced operational flexibility once the aircraft became committed to landing or take-off.

1.18 Additional Information

1.18.1 Nose Wheel steering

On the DHC-6 Twin Otter, the pilot does not normally "lock" the nose wheel. The pilot lines up for take-off and centres the nose wheel using tiller. The nose wheel is locked in the straight-ahead position for flight automatically through a mechanical centring mechanism rather than a direct, manual pilot lock. As the nose oleo strut fully extends after take-off, a peg on the upper torque arm engages a recess in a centring cap, holding the nose wheel straight.

- **Auto Mechanism:** The system is designed to automatically lock the nose wheel in the centre position for safety, when in the air (oleo extended) referred to as a "centring" mechanism.
- **Steering Mechanism and Control:** While on the ground, the steering is controlled by a hydraulic actuator commanded by a steering tiller on the PIC (left cockpit) yoke and directional control sometimes assisted by differential braking and/or asymmetric power.
- **High sensitivity:** The tiller mechanism is very sensitive at higher speeds such as during the take-off roll, making it easy to induce a rapid side-side pilot-induced oscillation (PIO).
- **Handling a PIO:** If a PIO begins, the recommended action is to stop overcorrecting with tiller, which may require taking hands off the tiller if the pilot is compounding the oscillation.
- **Loss of Directional Control Nose Wheel on Ground:** If directional control is lost on the ground, and airflow over the rudder and use of brakes and asymmetric power are not recovering the loss of directional control, use of tiller may be necessary.

The PIC informed the investigation that he applied full power and commenced the take-off roll and used rudder and asymmetric power to regain directional control. He said the tiller is used for taxiing and once full power was applied for a take-off the rudder usually becomes effective and so rudder was used.

1.18.2 Witness Video Footage and Appareo Cockpit Imagery

The witness video shows that:

- 3 seconds after commencing the take-off roll, the nose wheel had turned likely to align with the airstrip.
- Over the next 6 seconds the nose wheel increasingly turned left as the aircraft tracked to the left side of the airstrip.
- 9 seconds after commencing the take-off roll while sliding laterally to the right, the aircraft departed the airstrip at an angle of about 35 to 40 degrees to the airstrip direction.
- 10 seconds after commencing the take-off roll the aircraft was straightening to align with the airstrip when it departed the strip.

The investigation reviewed the Appareo cockpit onboard video recordings which showed that the PIC used full right tiller and minimum asymmetric power in an attempt to correct the left turn driving the aircraft to the left side of the strip. As the aircraft exited the strip, the aircraft heading aligned parallel to the airstrip while tracking through the long kunai grass parallel to the strip.

As the aircraft briefly tracked through the vegetation and became airborne, the PIC manipulated the tiller with his left hand and the power levers with his right hand. During this time, he was not holding the control column. Refer to 5.1 Appendix A

1.18.3 Tropicair de Havilland Canada DHC-6-300 Standard Operating Procedures

According to the Tropicair de Havilland Canada DHC-6-300 Standard Operating Procedures, section 3.6.2 'Taxiing', because of the location of the 'tiller', Twin Otter aircraft are taxied by the pilot occupying the left hand seat at all times. The right hand seat pilot shall assist by monitoring aircraft's clearance from obstacles while the aircraft is in motion.

The nose wheel steering system is primarily intended for use when manoeuvring on the airport apron or parking areas or for making turns from runways to taxiways and vice-versa. To maintain a straight path when taxiing, the nose wheel steering tiller should be left alone in the centre position and coarse (i.e. – full) deflection of rudder used to make necessary corrections to the aircraft's path down the taxiway.

Section 10.2.8 (d) 'note' states NOTE: Directional control by use of the tiller is not normally necessary during the take-off roll using the procedure above because with greater than 20 psi Tq, there is usually enough airflow over the rudder surface to maintain directional control using rudder.

Refer to *Appendix B for the Operator's Standard Operating Procedures relating to Ground Operations - Taxiing and Special Aerodrome Operations - Training.*

The investigation established through recorded evidence that the nose wheel steering tiller was used during the take-off roll at Tapini Airstrip. This differed from the guidance contained in the Tropicair de Havilland Canada DHC-6-300 Standard Operating Procedures, which states that directional control by use of the tiller is not normally necessary during the take-off roll. The use of the tiller as control is intended to transition to aerodynamic rudder effectiveness as airspeed increases.

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the *PNG Civil Aviation Act 2000*, and with the *Standards and Recommended Practices of Annex 13 to the Chicago Convention on International Civil Aviation*, and the PNG Accident Investigation Commission approved Investigation Policy and Procedures.

2. ANALYSIS

2.1 Flight Operations

On landing at Tapini Airstrip, the crew experienced slippery conditions. The investigation found that the slippery conditions were a result of a combination of freshly cut grass that was exposed to overnight rain and standing water which was a result of the lack of adequate water run-off drainage systems. These runway surface conditions presented operational challenges for the subsequent departure from Tapini Airstrip.

Prior to departure, the crew planned on how to execute a safe take-off. The PIC briefed the co-pilot that on taxi, he would park the aircraft across the top of the strip and position it at an angle (perpendicular) rather than straight down, to avoid the risk of sliding down the strip. This would assist with a rolling take-off once the aircraft was aligned with the runway for departure. The planned departure technique reflected the crew's assessment of the prevailing runway conditions at the time of departure.

The crew prepared the aircraft for the return flight to Port Moresby and completed all pre-take-off checks. The aircraft was taxied from the parking area to the departure end of Runway 09, in preparation for a rolling take-off. A combination of asymmetric power application, differential braking and nose wheel steering (tiller) was used to manoeuvre the aircraft safely to the top of the strip. When they reached the top of the strip (end of Runway 09), the aircraft was positioned perpendicular, while the crew completed the take-off safety brief. On completion of the take-off safety brief, the crew initiated the take-off.

2.1.1 Take-off and Directional control

On initiation of take-off, as the pilot initiated the turn onto the runway heading for a rolling take-off, the crew observed the aircraft begin to slide forward on the wet runway surface. The PIC simultaneously centred the tiller, advanced the power levers to take-off power and held back pressure on the control column as the aircraft rolled forward.

As the aircraft accelerated, the PIC applied right tiller input to maintain directional control. However, the input resulted in an excessive turn to the right. To correct deviation, the PIC applied full left tiller input and left rudder deflection. By this stage, the aircraft had accelerated to a speed at which aerodynamic rudder effectiveness was increasing, resulting in the aircraft overshooting towards the left-hand side strip. Right asymmetric power was also applied in an attempt to counter the developing deviation.

As the aircraft continued accelerating, its heading deviated again to the left, resulting in the aircraft tracking towards the left edge of the strip. The PIC reported applying full right rudder, full right tiller deflection and intermittent power adjustments in an attempt to correct the deviation and maintain runway alignment. Analysis of the Appareo flight data and video indicated that the aircraft's heading was subsequently corrected; however, the aircraft continued beyond the strip edge perimeter fencing and into overgrown vegetation. During this sequence, the nose wheel assembly was damaged after impacting the strip edge fencing.

The aircraft manufacturer and the operator's procedures prohibit the routine use of the nose wheel steering tiller during the take-off roll, as directional control is expected to transition from nose wheel steering to aerodynamic rudder effectiveness as airspeed increases. However, during this take off, the aircraft began sliding almost immediately following brake release and power application, at a speed where aerodynamic rudder effectiveness remained limited.

From a human factors perspective, the investigation considers that the PIC's use of the tiller was an instinctive response to an unexpected and rapidly developing loss of directional control situation rather than a deliberate deviation from standard operating procedures. Several interacting factors likely influenced this response, including:

- **The startle effect** and limited time available to react. The aircraft began sliding immediately after brake release and power application. The PIC had only seconds to react before the aircraft departed

the runway. Under these conditions, pilots often revert to well-practiced motor actions rather than consciously recalling procedural restrictions.;

- **Perception** that rudder authority was insufficient/minimal at low airspeed. At very low airspeed, rudder effectiveness is minimal because there is insufficient airflow over the vertical stabiliser. The PIC may have perceived that rudder inputs alone would not arrest the developing skid. The tiller provides immediate mechanical nose wheel steering while the aircraft remains on the ground, making it an intuitive control to use despite SOP prohibiting its use during take-off.;
- **Reduced nose wheel steering effectiveness** during the short-field take-off technique. The operator's short-field technique requires aft control column to unload the nose wheel. On the contaminated surface, this reduced nose wheel loading would also reduce steering effectiveness. Consequently, larger tiller inputs may have been applied in an attempt to obtain a response;
- **Contaminated runway condition.** Extremely low tyre-to-surface friction on the wet, muddy runway. On the muddy surface, tyre side loads were insufficient to generate normal steering forces. As the tyres slid rather than rolled, steering inputs became less effective, encouraging progressively greater control inputs.; and
- **Continuation bias** under deteriorating conditions. Once the aircraft was sliding downhill, the PIC's attention became focused on regaining control rather than adhering strictly to standard take-off technique. The use of the tiller was therefore likely an emergency control response rather than a deliberate procedural deviation.

It is highly likely that the regaining of the directional control was a result of rudder authority as the aircraft had accelerated to an acceptable ground speed for rudder steering effectiveness. Although the use of the tiller represented a deviation from the approved operating procedure, the investigation found no evidence that it initiated the runway excursion or restored directional control.

2.1.2 Component Structural damage

Based on the physical evidence and damage examination, it is highly likely that barbed and meshed wire from the perimeter fencing within the left strip edge vegetation became entangled around the nose wheel assembly and subsequently around the right main landing gear during the final stages of the ground roll.

As the aircraft continued to skid left, it impacted the strip perimeter fencing which consisted of the barbed and meshed wire held upright by short fencing pickets. The nose wheel assembly snagged the mesh wire, ripped it from the short fencing pickets and carried it forward with the mesh wire wrapped around the nose wheel oleo and fork structure, as the rest of the mesh wire trailed behind. With the aircraft's heading now to the right as it skidded left, it is highly likely that the trailing wire was in the path of the right-hand main landing gear wheel. The right main wheel overran the trailing wire mesh causing a sudden tug on the nose wheel fork where the wire mesh was wrapped around.

Additionally, the nose wheel was repeatedly subjected to high loads while skidding left with significant right steering inputs, producing stress concentrated on the nose wheel axle and fork. These loads induced fractures in the nose wheel fork as the aircraft accelerated during the directional control recovery sequence prior to becoming airborne.

Recognising that they had passed the committal point, the PIC elected to continue the take-off and applied full take-off power. The aircraft became airborne while still within the overgrown vegetation alongside the runway.

This additional loading acted on the fork that had already been fractured by the earlier loading events, causing the remaining material to fail completely and allowing the nose wheel assembly to separate from the nose landing gear shortly after lift-off. The detached nose wheel subsequently fell from the aircraft during the initial climb.

A detailed examination of the nose wheel fork and associated components found no evidence of pre-existing fatigue, historical cracking, corrosion, manufacturing defects or prior damage. All fractures exhibited overload characteristics consistent with the directional control loss and runway excursion sequence, confirming that the nose wheel assembly failure occurred as a consequence of the accident sequence.

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3. CONCLUSIONS

3.1. Findings

3.1.1 Aircraft

- a) The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.
- b) The aircraft had a valid *Certificate of Airworthiness*, *Certificate of Registration* and had been maintained in accordance with the *PNG Civil Aviation Rules*.
- c) The aircraft was certified as being airworthy when dispatched for the flight.
- d) The mass and the centre of gravity of the aircraft were within the prescribed limits.
- e) There was no evidence of any defect or malfunction in the aircraft that could have contributed to the occurrence.
- f) The aircraft was structurally intact prior to impact with the airstrip perimeter fence.
- g) The nose wheel assembly was subjected to increased loading as the aircraft drifted left towards the runway edge. This loading contributed to stresses within the nose wheel assembly.
- h) The nose wheel fork and right main wheel outer rim was fractured during the impact with the perimeter fence.
- i) The failure occurred due to the combined effects of these stresses, fence-wire entanglement and tensile overload, resulting in the nose wheel assembly separating from the aircraft when it became airborne.
- j) The nose wheel fork and lower oleo section were significantly damaged during the subsequent emergency (no nose wheel) landing and Port Moresby.

3.1.2 Flight Crew/Pilots

- a) Both pilots were licensed and qualified for the flight in accordance with the existing *PNG Civil Aviation Rules*.
- b) Both pilots were properly licensed, certified as medically fit and were adequately rested to operate the flight.

3.1.3 Flight Operations

- a) The aircraft was operating an IFR charter return flight from Tapini Airstrip, Central Province, to Jacksons International Airport, Port Moresby.
- b) Weather information obtained prior to departure from Port Moresby was generally limited to weather conditions and did not include runway surface conditions information.
- c) The pre take-off checks were completed before taxiing to the departure end of Runway 09, where they parked perpendicular to the runway in preparation for a rolling take-off. They then carried out their take-off safety briefing before initiating the turn for a rolling take-off.
- d) On initiation of the rolling take-off, as the aircraft aligned with runway heading, the crew noticed the aircraft slide forward on the wet runway surface. The PIC immediately applied take-off power and held back pressure on the control column as the aircraft rolled forward.
- e) Shortly after take-off power was applied, the aircraft yawed to the right of the runway heading.

- f) The PIC's use of asymmetric power and rudder were insufficient to correct the loss of directional control; the aircraft overshot the runway centreline and continued to drift left.
- g) The PIC used full right (nose wheel steering) tiller and some asymmetric power, to arrest the loss of directional control when he saw the loss of directional control worsening.
- h) Despite further control inputs, including full nose wheel steering through the tiller, directional control was not regained.
- i) The aircraft departed the prepared runway surface and entered long vegetation on the left side of the runway.
- j) The aircraft subsequently turned back toward the runway.
- k) The aircraft became airborne approximately 30 seconds after the take-off roll commenced, after travelling approximately 550 m along the strip.
- l) The operator's Route Guide for DHC-6 operations cautioned pilots about the slippery condition of the airstrip after rain.
- m) The operator and the aircraft manufacturer caution against the use of the nose wheel steering tiller for steering during the take-off roll.
- n) The manufacturer and operator's procedures provide guidance for corrective steering action in the event of a loss of directional control during the take-off roll.
- o) The aircraft's Quick Reference Handbook (QRH) and Pilot's Operating Handbook (POH) did not contain procedures for conducting an emergency landing following the loss of the nose wheel assembly.

3.1.4 Air Traffic Services and Airport Facilities

- a) The aircraft's HF and VHF communication systems remained serviceable, enabling continuous communication with Air Traffic Control during the emergency.
- b) There was no appointed agent or trained personnel on the ground at Tapini Airstrip to provide appropriate weather information and runway condition information to inbound aircraft.
- c) The ATC provided prompt and effective assistance to the flight crew throughout the emergency.
- d) Jacksons International Airport emergency services rendered appropriate and effective assistance to the flight crew.

3.1.5 Flight Recorders

- a) The aircraft was fitted with an L3 FA5000 Flight Recorder. Attempts to download recorded data from the Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) were unsuccessful. Consequently, the investigation relied on data recorded by the Appareo AIRS 400 unit.

3.1.6 Medical

- a) Both pilots held valid Class 1 Medical Certificates and were certified as medically fit to exercise the privileges of their licences at the time of the occurrence.
- b) There was no evidence that either pilots suffered any sudden illness or incapacitation that may have affected their ability to operate the aircraft.

3.1.7 Survivability

- a) None of the aircraft occupants sustained injuries as a result of the occurrence.

- b) All occupants evacuated the aircraft safely following the occurrence.

3.1.8 Safety Oversight

- a) The Civil Aviation Safety Authority's safety oversight of the operator's procedures and operations was adequate.

3.2 Causes [Contributing factors]

The investigation identified that the occurrence resulted from a combination of environmental, aerodrome, and human factors. The severely reduced runway surface friction resulting from heavy overnight rainfall, which left the grass runway surface at Tapini Airstrip wet, muddy, and slippery. Poor drainage at the airstrip contributed to water accumulation and deterioration of the runway surface condition, significantly reducing braking effectiveness, steering authority, and tyre traction during the take-off roll.

Contributing aerodrome factors included the approximately 4.5% downhill gradient and lateral slope of Runway 09, which increased the aircraft's tendency to slide on the contaminated surface and reduced the effectiveness of directional control inputs. The presence of overgrown vegetation and perimeter fencing adjacent to the runway also increased the likelihood and severity of damage during the runway excursion.

Contributing human factors included the control inputs applied by the pilot-in-command in response to the developing loss of directional control. As the aircraft was already skidding on a low-friction surface, the use of rudder, nose wheel steering (tiller), and asymmetric power increased the loading and structural stresses acting on the nose wheel assembly. These stresses contributed to the damage sustained by the assembly; however, the subsequent failure resulted from the combined effects of these stresses, entanglement with perimeter fencing wire, and overload during the runway excursion sequence.

The investigation also identified that limited runway condition information available prior to departure reduced the crew's ability to fully assess the operational suitability of the airstrip under the prevailing wet-season conditions. The absence of a structured runway condition assessment, including surface condition and braking action reporting, increased the operational risk associated with conducting a take-off from the contaminated runway surface.

4. SAFETY ACTIONS

The operator voluntarily implemented a number of safety actions. These actions were taken independently of the investigation and do not constitute formal safety recommendations issued by the AIC.

4.1 Safety Actions Taken During the Investigation

On 13 May 2026, Tropicair Limited advised the Accident Investigation Commission (AIC) with evidence that it had implemented the following safety actions:

1. Completed a risk assessment of operations into Tapini Airstrip to identify and address hazards associated with operating at the airstrip.
2. Developed and delivered a weather observation and runway condition reporting training package for the Tapini Airstrip agent.
3. Procured and installed a rain gauge at Tapini Airstrip to improve the accuracy of local weather observations.
4. Reviewed and updated its Route Guide and operating procedures for operations into wet and sloping remote airstrips which includes Tapini.
5. Cleared the Tapini Airstrip drainage system and vegetation along the runway edges to improve surface drainage and reduce water accumulation.

This Final Report is released by;
Accident Investigation Commission
Ministry of Civil Aviation
Papua New Guinea

27 October 2026

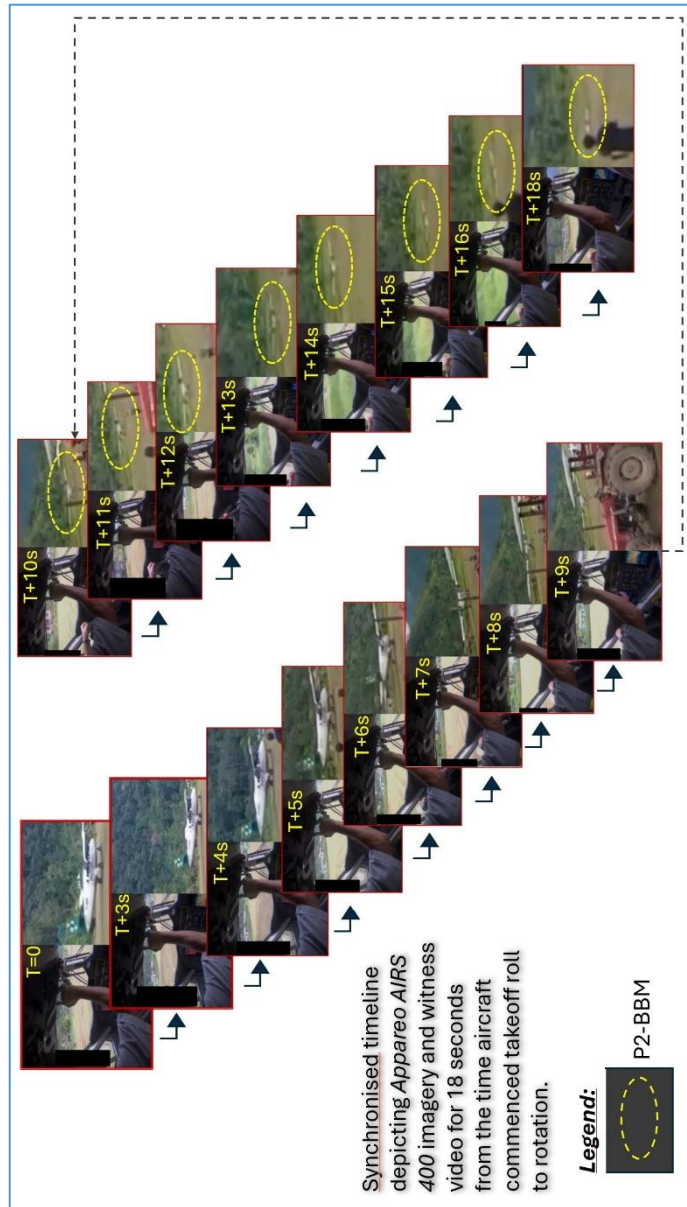



MARYANNE J. WAL
CHIEF COMMISSIONER / CHAIRMAN


CAPTAIN ARIA BOURAGA
COMMISSIONER / DEPUTY CHAIRMAN

5 APPENDICES

5.1 Appendix A: Timeline P2-BBM take-off roll at Tapini Airstrip



5.2 Appendix B: Tropicair de Havilland Canada DHC-6-300: Standard Operating Procedures (SOP)

5.2.1 Appendix B1 Ground Operations -Taxiing

3.6.2 Taxiing

Because of the location of the 'tiller', Twin Otter aircraft are taxied by the pilot occupying the left hand seat at all times. The right hand seat pilot shall assist by monitoring aircraft's clearance from obstacles while the aircraft is in motion.

The nose-wheel steering system is primarily intended for use when manoeuvring on the airport apron or parking areas or for making turns from runways to taxiways and vice-versa. To maintain a straight path when taxiing, the nose-wheel steering tiller should be left alone in the centre position and coarse (i.e. – full) deflection of rudder used to make necessary corrections to the aircraft's path down the taxiway.

Avoid prolonged brake application to control taxi speed as this causes high brake temperatures and increased wear on the brakes themselves. If taxi speed is too high, reduce speed by selecting zero thrust with the power levers.

Under normal conditions, differential braking and braking while turning should be avoided. Allow for decreased braking effectiveness on wet or slippery surfaces. Avoid following other aircraft too closely and be reminded that jet blast is a major cause of FOD.

During taxi, the use of reverse thrust above zero thrust is not recommended due to the possibility of FOD and engine surge. Momentary use of reverse thrust for aircraft control on slippery surfaces is approved as required.

5.2.2 Appendix B2: Special Aerodrome Operations-Training

10.2.8 Training

After the last period of any ICUS training, a newly endorsed DHC-6 Captain is to undergo a session of training with an approved pilot wherein the training pilot demonstrates unorthodox situations on at least three take-offs and landings. The trainee Captain must demonstrate his ability to rectify an abnormal take-off or landing situation.

Newly endorsed First Officers are to complete 25 hours with an ICUS Captain before being 'checked to line'. This requirement may be completed on normal revenue flights.

Two pilot DHC-6 'Take-off' procedures, when the First Officer is manipulating the controls, will be as follows:

- a) the First Officer will manipulate all the controls
- b) the First Officer will advance the power levers to 20 PSI Tq while the aircraft is held stationary on the brakes and will then release the brakes and control the aircraft while he advances the power levers to take-off power
- c) the Captain will call for any minor power adjustments necessary
- d) if directional control is being lost during the initial aircraft movement, the First Officer will make one call for tiller assistance (i.e. - "left tiller") and the Captain will make one (and only one) minor tiller input to aid in directional control

5.3 Appendix C: Diagram of Damage to Nose Landing Gear (NLG) Assembly – Nose Wheel

