ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT

AIC 23 -1004

Strickland Bosavi Foundation Limited

VH-MZL

Cessna U206G

Runway excursion during aborted take off

Dodomona Airstrip

Western Province

PAPUA NEW GUINEA

7 June 2023

ABOUT THE AIC

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

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

The AIC performs its functions in accordance with the provisions of the *PNG Civil Aviation Act 2000 (As Amended),* and the *Commissions of Inquiry Act 1951,* and 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.

ABOUT THIS REPORT

On 7 June 2023, at 16:44 local, (06:44 UTC), the AIC was notified by the operator, Strickland Bosavi Foundation, via a phone call, of an accident involving it's Cessna 206 aircraft, registered VH-MZL. The accident was reported to have occurred at 15:10 during an aborted take-off, at Dodomona Airstrip, Western Province, Papua New Guinea. The AIC immediately commenced the investigation.

This Final Report has been produced by the AIC, P.O Box 1709, Boroko 121, 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

5 September 2024

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GLOSSARY OF ABBREVIATIONS

AD	:	Airworthiness Directive
AFM	:	Airplane Flight Manual
AGL	:	Above Ground Level
AIC	:	Accident Investigation Commission
AMSL	:	Above Mean Sea Level
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Control
ATPL	:	Air Transport Pilot License
ATS	:	Air Traffic Service
CASR	:	Civil Aviation Safety Rules
CPL	:	Commercial Pilot License
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
DME	:	Distance Measuring Equipment
EFIS	:	Electronic Flight Instrument System
FL	:	Flight Level
F/O	:	First officer or Copilot
FDR	:	Flight Data Recorder
GPWS	:	Ground Proximity Warning System
hPa	:	Hectopascals
Hrs	:	Hours
ICAO	:	International Civil Aviation Organization
IFR	:	Instrument Flight Rules
IIC	:	Investigator in Charge
ILS	:	Instrument Landing System
Kg	:	Kilogram(s)
Km	:	Kilometer(s)
Kts	:	Knots
Mm	:	Millimeter(s)
MTOW	:	Maximum Take-off Weight
NM	:	Nautical mile(s)
°C	:	Degrees Celsius
PIC	:	Pilot in Command
RPM	:	Revolution Per Minute
SCT	:	Scattered
S/N	:	Serial Number
TS/RA	:	Thunderstorm and rain
TAF	:	Terminal Aerodrome Forecast
TSN	:	Time Since New
TTIS	:	Total Time in Service
UTC	:	Universal Time Coordinate
VFR	:	Visual Flight Rules
VMC	:	Visual Meteorological Conditions

SYNOPSIS

On 7 June 2023, at about 15:10 local (05:10 UTC), a Cessna 206 aircraft, registered VH-MZL, owned and operated by Strickland Bosavi Foundation Limited (SBFL) was conducting a Private VFR flight from Dodomona Airstrip to Mougulu Airstrip, Western Province, Papua New Guinea, when during take-off, the aircraft overran the runway, overturned and came to rest inverted.

There were four persons on board the aircraft: one pilot and three passengers. There were no injuries reported.

The pilot recalled that while the passengers were boarding, he noticed local winds which he described as gusts between 5-8 kts. The pilot proceeded to configure the aircraft for a short field take-off, then taxied to runway 23, where he lined the aircraft up for take-off. The pilot applied full power, released the brakes and began accelerating down the runway. He stated that he planned to do an acceleration check during the take-off roll immediately prior to reaching an undulation on the airstrip. The speed that he expected to reach for the take-off to continue was 40 kts. However, when he reached the acceleration check point (ACP) and checked the airspeed indicator, he observed a lower speed. He consequently actioned abort take-off procedure. The aircraft continued with momentum and became airborne at the undulation. The aircraft travelled forward in the air for about 70 m before contacting the ground. The pilot applied brakes once the aircraft contacted the ground again, but the aircraft began to skid with momentum while veering left of the runway.

The aircraft travelled a distance of 172 m while skidding before changing direction to the right, towards the centreline. The aircraft continued skidding and rolled off the edge of runway where it overturned and came to rest inverted, 14 m from the edge of the runway.

The runway excursion was primarily caused by the pilot's nominated Acceleration Check Point (ACP) on an undulation and the pilot's inadequate situational awareness. The runway was considerably wet and slippery, and there were wind gusts (tailwind) present. The ACP was not adjusted to cater for the prevailing conditions. Furthermore, the nominated ACP was not in an appropriate position considering that there was chance that the pilot would abort take-off at that point. When the decision to abort was made, the pilot did not have any space to decelerate before reaching the undulation. With a high ground speed, the aircraft became airborne at the undulation. When the aircraft unexpectedly became airborne, with a relatively high groundspeed due to tailwind, the aircraft travelled forward in the air losing approximately 70 meters of runway length critical for braking.

Further contributing to the accident was the pilot's interpretation of the prevailing wind conditions. Despite perceivingthe wind to be varying between 5-8 knots, the actual wind during take-off was stronger than anticipated.
The pilot's reliance on a limp, unserviceable windsock and failure to use nearby surroundings to assess wind conditions led to an incorrect judgement. This lack of awareness about wind conditions significantly influenced the pilot's decision-making during the take-off roll.

The AIC recommends that SBFL should ensure that its pilots are familiarised with the different conditions and characteristics of airstrips that SBFL operates to, as well as the appropriate actions required for safe operations to those airstrips.

The AIC established that CASA PNG was not aware that VH-MZL, an Australian registered aircraft, had been operating in PNG. The operator had requested from and was granted authorisation by way of a permit by the Department of Transport (DoT) pursuant to Section 201 of the Civil Aviation Act 2000 (as Amended). The AIC identified that it is implied in the CA Act through Section 201A that CASA PNG shall become aware of non-scheduled international flights to and from PNG, and any authorisations or permits issued thereunder, to enable CASA PNG to effect its mandated obligation under Section 66. However, in this instance, CASA PNG was not aware of the permit that was granted to SBFL by DoT.

The AIC recommends that DoT should ensure that CASA PNG is notified of authorisations granted by way of issued permits for non-scheduled foreign aircraft flights into and around PNG.

1 FACTUAL INFORMATION

1.1 History of the flight

On 7 June 2023, at about 15:10 local (05:10 UTC[1]), a Cessna 206 aircraft, registered VH-MZL (MZL), owned and operated by Strickland Bosavi Foundation Limited (SBFL), was conducting a Private VFR[2] flight from Dodomona Airstrip to Mougulu Airstrip, Western Province, Papua New Guinea, when during take-off roll, the aircraft ran off the edge of the runway and overturned into the sloping terrain.

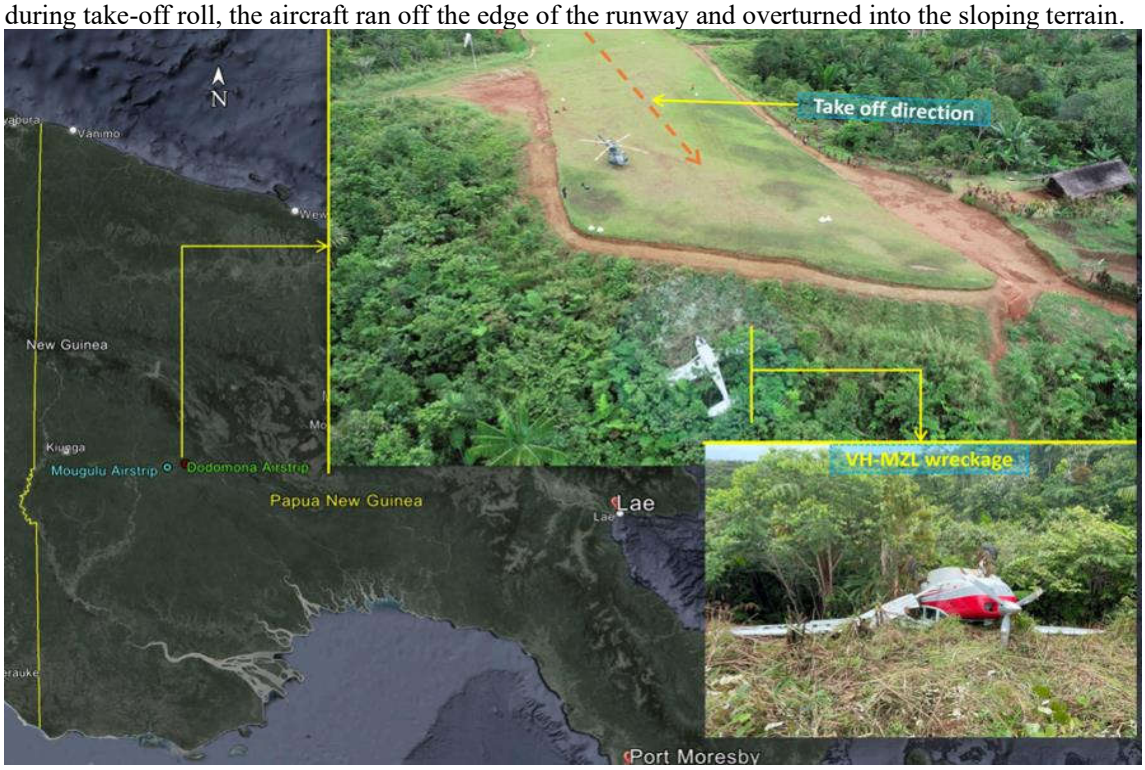


Figure 1: Accident site at Dodomona showing VH-MZL wreckage. (Source: Google Earth, annotated by AIC)

There were four persons on board; one pilot and three passengers.

A copy of the flight plan filed by the pilot at 07:05 on the day of the accident was provided to the AIC by the operator. The flight plan indicated that there were three sectors planned for the day; Mougulu to Suabi, Suabi to Debepari and Debepari back to Mougulu. According to the operator, amendments were made to the plan due to weather and operational requirements. The pilot operated twelve sectors within the Middle Fly District of Western Province before the accident. *Refer to section 1.18.1* for more details on the flights.

The twelfth sector preceding the accident was from Mougulu to Dodomona. According to the operator, the flight departed Mougulu at 14:40 and arrived at Dodomona about 6 minutes later. The pilot stated that upon arrival at Dodomona, he unloaded the cargo and the passenger then re-configured the aircraft cabin by installing the two rear seats that had been removed and stored in the cargo compartment to accommodate cargo from Mougulu.

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 accident, Papua New Guinea Time (Pacific/Port Moresby Time) is UTC +10 hours.
2 Visual Flight Rules.

According to the pilot, prior to departure, during loading of cargo and passengers, he felt wind gusts[3] estimated at speeds between 5 to 8 knots.

He stated that upon completion of loading and pre-flight checks, he started up the aircraft, set flaps to 20 degrees and taxied to line-up for a short-field take-off[4] on runway 23. After lining up, with brakes applied, the pilot applied full power for take-off. As he checked the engine gauges, prior to brake release, the aircraft crept forward a couple of metres. He, therefore, decided to turn the aircraft back andline up again for another take-off attempt.

On powering up for take-off the second time, the aircraft remained in position. He completed the remainder of his checks and observed no abnormal indications with fuel, manifold pressure, and RPM[5] and therefore he opted to proceed with the take-off roll.

With full power applied, the pilot released the brake, and the aircraft began rolling forward and accelerated down the runway. The pilot reported to the AIC that he nominated an acceleration check point (ACP)[6] at a position along the runway immediately prior to a undulation about 180 m down the airstrip. The speed that he expected to reach for the take-off to continue from that point was 40 kts. However, when he reached ACP, during the take-off roll and checked the airspeed indicator, he observed a lower airspeed.

Because of that observation, he immediately executed the *Engine Failure/Abort During Takeoff Procedure* (see *5.1, Appendix 5.1.2*). The aircraft continued with momentum and bounced off the bump in the undulation and became airborne. The aircraft travelled forward in the air for about 70 m before contacting the ground again and continued to roll forward.

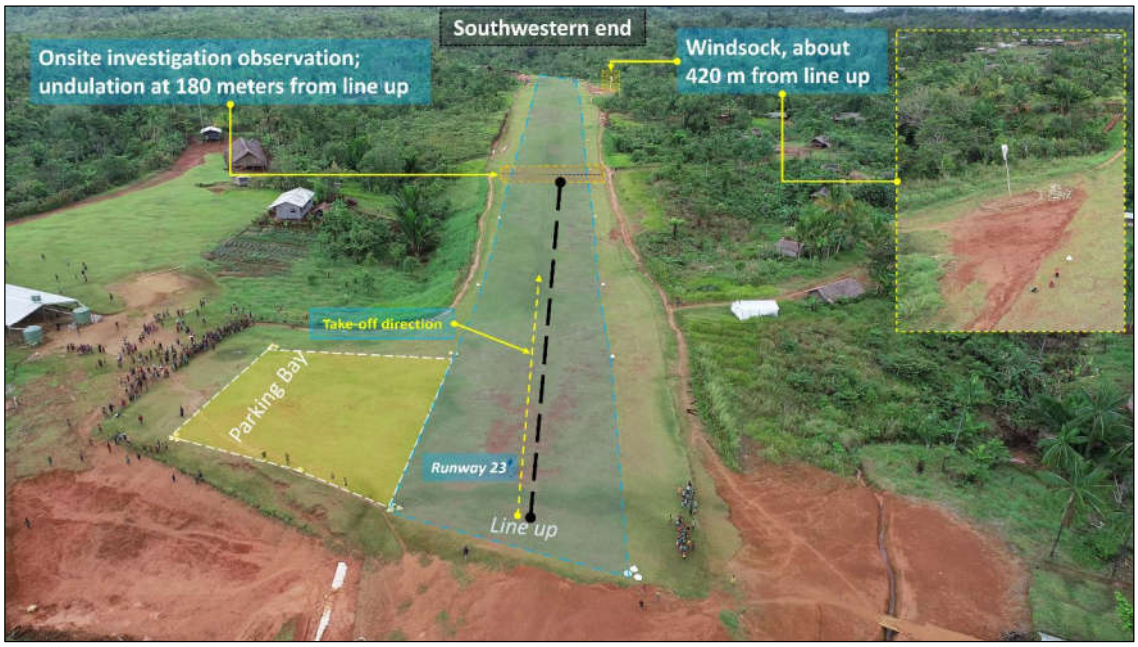


Figure 2: View of the airstrip from the Northeastern end of the strip.

The pilot stated that upon contacting the ground, he applied full brakes, but felt the aircraft skidding and inadvertently travelling left of the centreline. He therefore, began to intermittently release the brakes. The pilot recalled that at that point the airspeed was about 35 kts.

According to the pilot, as he was nearing the left edge of the airstrip, he tried to manoeuvre the aircraft back to the centreline. However, at some point, he realized that he would not be able to stop the aircraft

3 Refer to Section 1.18.2 for more information on wind.

4 Refer to Section 5.1 Appendix A, 5.1.1 for C206 Quick Reference Handbook (QRH) Normal (Short Field) Take- off procedures.

5 Revolution per minute.

6 Refer to 5.2 Appendix B, 5.2.1 for more information on the Accelerated Check Point.

in time. He therefore, resumed full application of brakes to slow the aircraft. The aircraft began skidding and rotating right as momentum carried it past the edge of the airstrip. The aircraft subsequently came to rest inverted 14 m down the adjacent embankment.

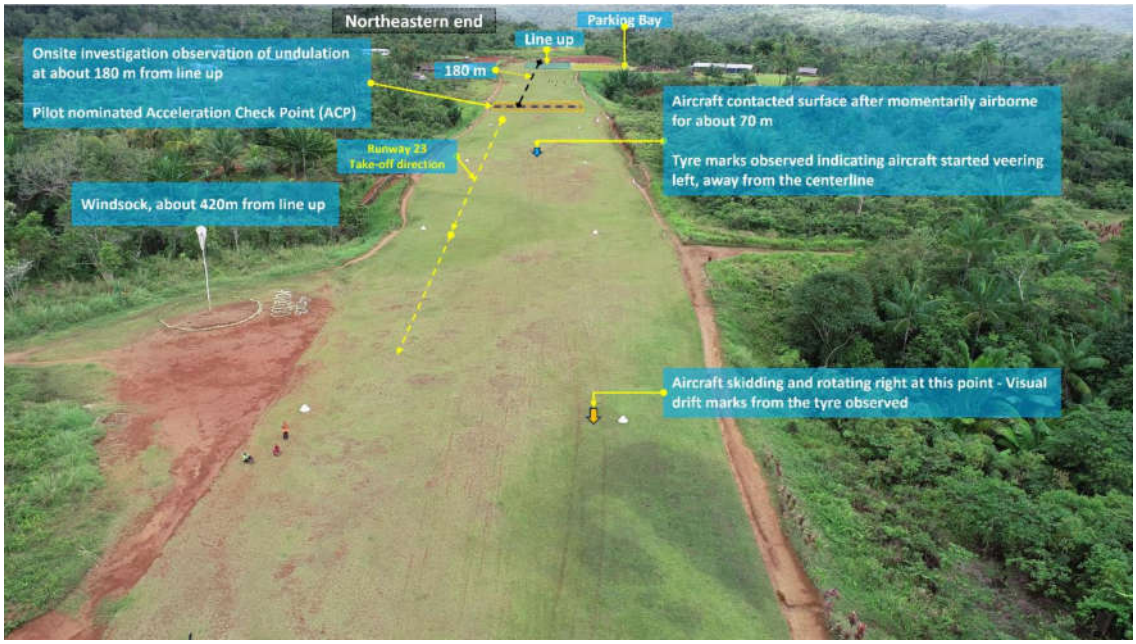


Figure 3: View of the airstrip from the Southwestern end of the strip.

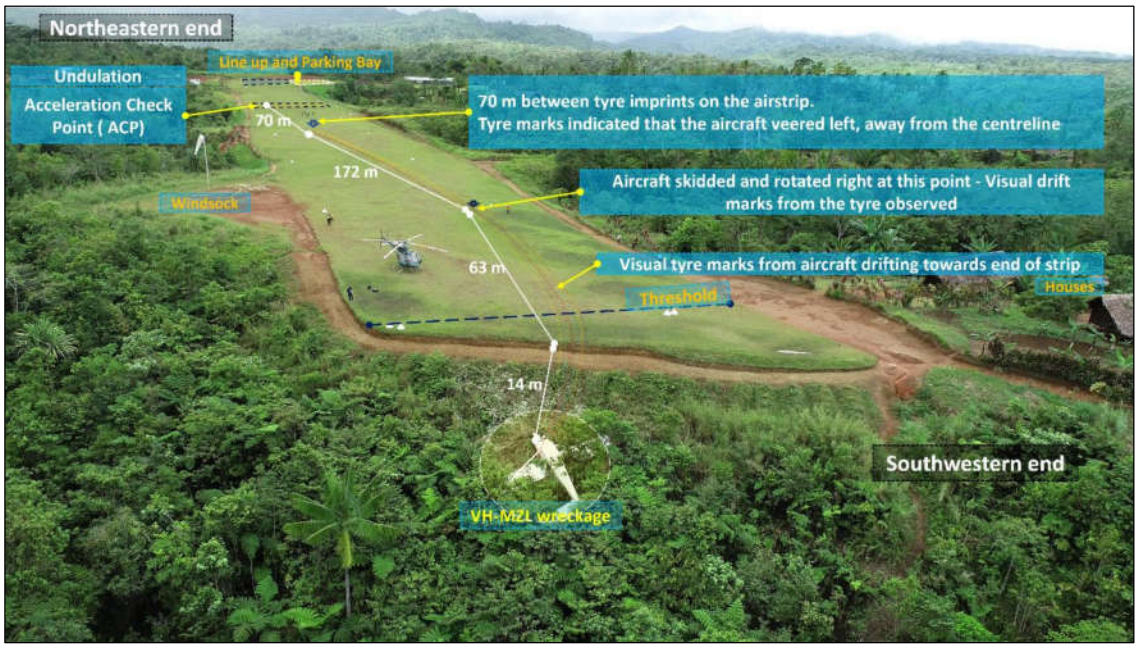


Figure 4: Image showing events from undulations to the aircraft's final position.

According to the pilot, when the aircraft came to a complete stop invertedly, he shut down the engine and instructed the three passengers to exit the aircraft immediately through the right-side cockpit door and make their way up the embankment, onto the airstrip.

The pilot also exited the aircraft through the right-side cockpit door and made his way up to the airstrip shortly after.

1.2 Injuries to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	1	3	4	Not applicable
TOTAL	1	3	4	-

Table 1. Injuries to persons

1.3 Damage to aircraft

The aircraft was substantially damaged. Refer to *Section 1.12* of this report for detailed information.

1.4 Other damage

There was no other damage to property and/or the environment, as a result of this accident.

1.5 Personnel information

1.5.1 Pilot

Age	: 42 years
Gender	: Male
Nationality	: Australian
Position	: Pilot
Type of licence	: Australian Private Pilot License (PPL)
	: Australian Commercial Pilot Licence (CPL)
Valid to	: Perpetual
Rating	: Single Engine Aircraft (SEA),
	: Multiengine Aircraft (MEA)<5700 kg MTOW
Total flying time	: 1213.2
Total on this type	: 874.7
Total last 7 days	: 18.9
Total on type last 7 days	: 18.9
Total last 24 hours	: 7.2
Total on the type last 24 hours	: 7.2
Total in command last 24 hours	: 7.2
Hours awake prior to occurrence	: 10.5
Duration of last sleep period	: 7.4
Medical class	: CASA Australia Class 1 and Class 2
Valid to	: Class 1 - 30 July 2023
	: Class 2 - 30 July 2024
Medical Limitation	: Must use CPAP[7] in sleep period prior to exercising privileges of medical certificate.

7 CPAP (continuous positive airway pressure) is a machine that uses mild air pressure to keep breathing airways open while you sleep. It is used to treat sleep-related breathing disorders including sleep apnoea, (OSA).

Records provided by the operator to the AIC showed that at the time of the accident, the pilot held a valid Australian Private Pilot Licence and appropriate ratings in accordance with CAR Part 61.5, and a valid Class 2 Medical Certificate in accordance with CAR Part 61.35. This allowed the pilot to exercise the privileges of a Private Pilot Licence in accordance with CAR Part 61.155.

According to the operator, the pilot underwent supervised familiarization flights over the routes and airstrips typically operated by SBFL before being authorized for solo operations. The pilot's Logbook also indicated that he commenced his route and aerodrome familiarization flights on 9 September 2017 and subsequently transitioned to operating solo flights for SBFL on 13 February 2018.

Due to the nature of the SBFL's operations, the pilot would fly into PNG and carry out flight operations for the Foundation when required. According to the pilot's logbook, between 2018 and the date of the accident on 7 June 2023, he had entered PNG on fourteen occasions, conducting flights less than a month at a time before returning to Australia.

1.5.2 Pilots' recent history on Cessna C206 operation into Dodomona Airstrip

During interview with the AIC, the pilot stated that he had operated into Dodomona on several occasions prior to the accident and was familiar with the airstrip. His logbook showed that he had conducted 44 flights to Dodomona.

The pilot's logbook showed that he had last operated in PNG between 28 November 2022 and 16 December 2022 before returning to Australia. During this time, the pilot conducted a landing and take-off at Dodomona on 6 December and on 7 December.

On 16 December 2022, the pilot flew the aircraft from PNG to Australia, and later conducted a flight on 17 December 2022 in Australia. The pilot did not record any flights after that.

On 27 May 2022, the pilot recorded a simulator training flight for the purpose of approach recency, and later recorded on 4 June 2022 a flight for circuits at Mareeba, Australia.

The pilot then returned to PNG on 5 June 2023 to resume operations in the Middle Fly District. The accident at Dodomona Airstrip occurred on 7 June 2023; six months after the pilot had last operated out of that airstrip.

1.6 Aircraft Information

1.6.1 Aircraft Data

Aircraft manufacturer	: Cessna
Model	: C206
Serial number	: U20606661
Year of manufacture	: 1982
Total Hours airframe hours	: 17,241.8
Total airframe cycles	: Unknown
Nationality and registration mark	: Australian, VH-MZL
Certificate of Registry issued	: 25 February 2022
Name of the owner	: Strickland Bosavi Foundation Limited
Name of the operator	: Strickland Bosavi Foundation Limited

1.6.2 Engine Data

Manufacturer	: Continental
Model	: IO-520-F17B
Serial Number	: 1006813
Total Time Since New	: 1,635.5
Total Time Since Overhaul	: 1,635.5

Evidence reviewed indicated that Engines were not a contributing factor to this accident.

1.6.3 Propeller Data

Manufacturer	: Hartzell
Serial Number	: FP2727B
Total Time Since New	: 5,928.60 hours
Total Time Since Overhaul	: 1,186.70 hours

Evidence reviewed indicated that Propellers were not a contributing factor to this accident.

1.6.4 Airworthiness and Maintenance

At the time of the accident, the aircraft had a valid Certificate of Airworthiness (CoA) issued pursuant to sub-regulation *21.176(5) of the Civil Aviation Regulations* of Australia.

The maintenance records were reviewed during the investigation and identified that there were no outstanding scheduled maintenance and defects. Therefore, the aircraft was serviceable at the time of the accident.

1.6.5 Weight and Balance Data

The published maximum take-off weight for the aircraft is 1,633 kg as stated in the Manufacturer's *Cessna 206U Aircraft Flight Manual.*

The operator provided the AIC with a copy of the Load and Trim Sheet for the accident flight, which was completed electronically by the pilot, and it showed that the aircraft departed with a take-off weight of 1,454 kg. The records showed that the Take- off weight and Centre of Gravity (CoG) were within prescribed limits for the flight.

1.7 Meteorological information

1.7.1 Pilot's weather observation

During interview, the pilot described the weather on the day of the accident, referencing the cloudy and intermittent showers weather on the day of the onsite investigation, as being "cooler and wetter". He recalled wind gusts blowing from the East, estimating the wind speed to be between 5 to 8 kts.

Additionally, the pilot mentioned noticing a tailwind during his take-off roll and just before deciding to abort take-off at the designated ACP.

1.7.2 Area Forecast

The ARFOR[8] covering Dodomona-Mougulu area issued by PNG National Weather Service (NWS) effective from 9:00 am to 9:00 pm on 7 June 2023 was:

Overview:	**Scattered showers and thunderstorms with rain areas.**
Upper Winds:	2,000 ft 130 degrees at 35kts 5,000 ft 120 degrees at 30kts 7,000 ft 110 degrees at 25kts 10,000 ft 090 degrees at 20kts 14,000 ft 130 degrees at 10kts 18,500 ft 090 degrees at 15kts.
Cloud:	Isolated cumulonimbus base at 1,800 ft tops at 45,000 ft. Broken stratus at 500 ft. Scattered Cumulous base at 1,500 ft tops at 10,000 ft with broken showers. Scattered Stratocumulus base at 3,000 ft tops at 8,000 ft with broken rain drizzle. Scattered Altocumulus Altostratus base at 10,000 ft tops at 18,000 ft.
Visibility:	500 m in fog 3,000 m in thunderstorms and rain 4,000 m in showers of rain and rain drizzle.
Weather:	Fog, Thunderstorm with rain and rain drizzle.
Freezing Level:	15,000 ft.
Ice:	Severe with Cumulonimbus moderate including above freezing level.
Turbulence:	Severe in vicinity of Cumulus and Cumulonimbus. Moderate adjacent mountains.

Table 2: Area Forecast for Dodomona - Mougulu Area. (Source: PNG National Weather Services.)

1.8 Aids to navigation

Neither navigational aids nor their serviceability was a factor in this accident.

1.9 Communications

The aircraft was equipped with a High Frequency (HF) and Very High Frequency (VHF) two-way communication radio. Both communication systems were determined to be serviceable.

8 Area Forecast of visual meteorological conditions, clouds, and general weather conditions over a designated area over a 12-hour period.

1.10 Aerodrome information

1.10.1 General Information

Dodomona Airstrip is situated in the Middle Fly District of Western Province. It is about 11 nautical miles (NM) northeast of Mougulu Airstrip and about 31 NM southwest of Tari Airport in Hela Province.

Figure 5. Location of Dodomona Airstrip in reference to Mougulu Airstrip and Tari Airport. (Source: Google earth, annotated by AIC)

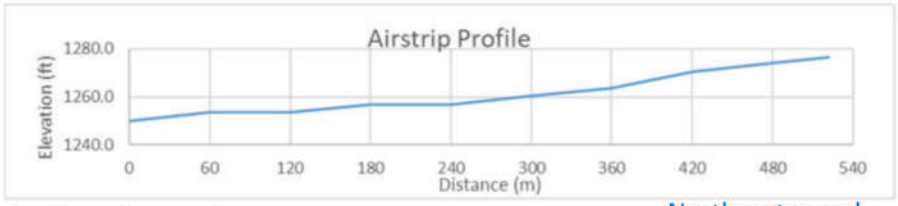
1.10.2 Airstrip data

During the investigation, the Rural Airstrip Agency (RAA) provided AIC with their *Rural Airstrip Survey Report* of Dodomona Airstrip. The survey date was 24 November 2021. T*able 3* below shows the Dodomona Airstrip data. *Figure 6* show the profile assessment results, as per the survey carried out in 2021.

Airstrip name	Dodomona		
Airstrip code	DMN		
Date surveyed	24 November 2021		
Surveyed by	Rural Airstrip Agency of PNG Limited		
Province:	Western Province	Airstrip type:	☒one-way two-way
Take-off direction	234°		
Co-ordinates *(at parking bay)*	S 06°14.545'		
	E 142°37.057'		
Runway width	30 m		
Runway strip width	30 m		
Runway length:	522 m		
Elevation *(at parking bay)*	1729 ft		
Elevation *(at threshold)*	1702 ft		
Average overall slope	1.5 %		

Table 3: Dodomona Airstrip Survey Data

Airstrip Profile



Southwestern end
(Threshold)

Northeaster end
(Line up/ Parking Bay)

Longitudinal Slope	
Length (m)	Slope
0-60m	1.7%
60-120m	0%
120-180m	1.7%
180-240m	0%
240-360m	1.7%
360-420m	3.5%
420-522m	1.7%

Source: RAA survey report, annotated by AIC.

Figure 6. Dodomona Airstrip Profile.

RAA informed the AIC that during the survey, an undulation, approximately 180 m from the line-up end of runway 28 was identified. Its height was measured to be about 50 cm.

1.10.3 Onsite observation

During the onsite investigation, it was observed that the runway surface at Dodomona Airstrip comprised of fine-grain soil (silt, clay). The overall surface hardness is medium; surface towards the line up and takeoff area is hard, while the surface in the second half of the runway is medium to soft. The airstrip was mostly covered with short grass which is maintained at an acceptable level all around the runway and towards the strip edges. The airstrip had water drainage run-off on the edges on both sides of the runway.

An undulation was observed about 180 m from the aircraft take-off initiation position.

The airstrip has a windsock situated about 420 m from the take-off end of the strip to the right of the airstrip (see *Figure 7).* Cone markers are placed along each side of the airstrip.

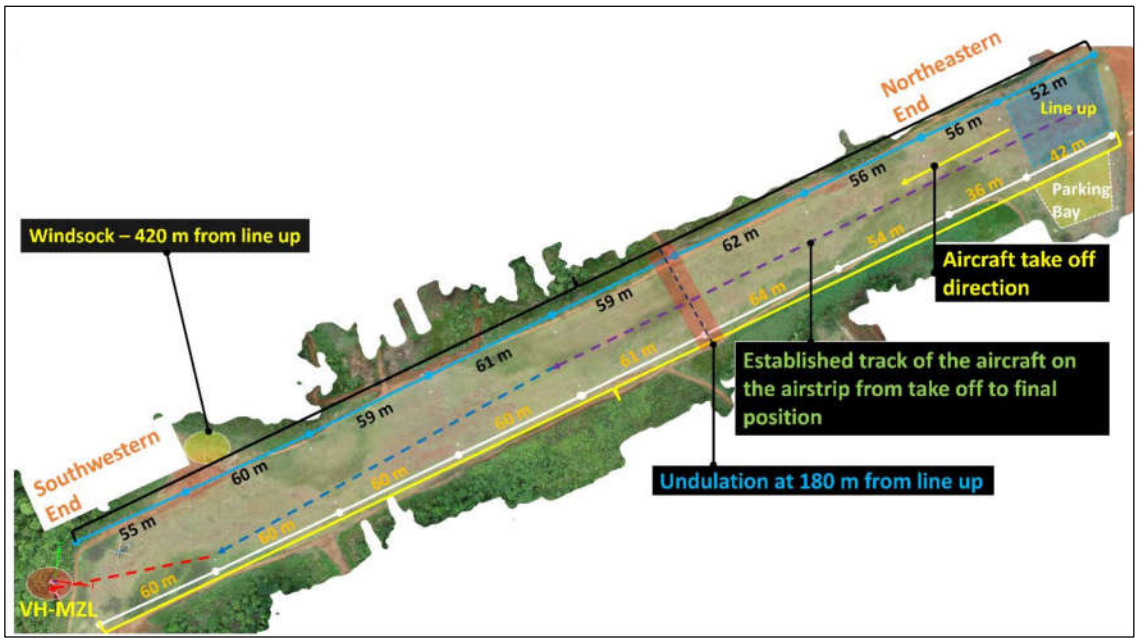


Figure 7. Modelling of Dodomona Airstrip including points and measurements of interest.

1.11 Flight recorders

The aircraft was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by the current regulations of the State of Registry, Australia.

1.12 Wreckage and Impact Information

1.12.1 General Description of the Wreckage

The tyre imprints on the strip revealed that following the aborted take-off and after being momentarily airborne from the take-off roll, both the main tyres as well as the nose tyre, maintained contact with the strip surface up to the point the aircraft ran off the edge of the strip.

After the aircraft made contact again with the runway surface, at 250 m from the line-up point of runway 23, the tyre imprints displayed an unusual trajectory. The aircraft initially veered left of the centreline, then swung back to the right, skidding toward the centreline.

Tyre markings show that when the aircraft veered back to the right, the nosewheel tyre and the right main tyre tracks intersect, indicating that the aircraft was rotating laterally toward the right and that the aircraft was skidding across the surface with momentum. This caused the nosewheel track to transition to the outer right track, while the track of the right main tyre became the middle track. The aircraft's tyre tracks showed that the tyres maintained this configuration until it reached the edge of the strip. The

tyre imprints where the nose tyre intersected with the right main tyre corresponded with the pilot's statement that at that point, he performed a ground loop[9].

The layout of these tyre tracks also clearly indicated that while the aircraft continued down the airstrip, it was evident that the aircraft experienced a change of heading to the right, while it maintained tracking or continued drifting for the final 63 meters of the airstrip, towards the end.

Ultimately, it veered off at the southwestern end of the runway and flipped over, with the left-wing tip and the nose contacting the ground and subsequently came to rest inverted.

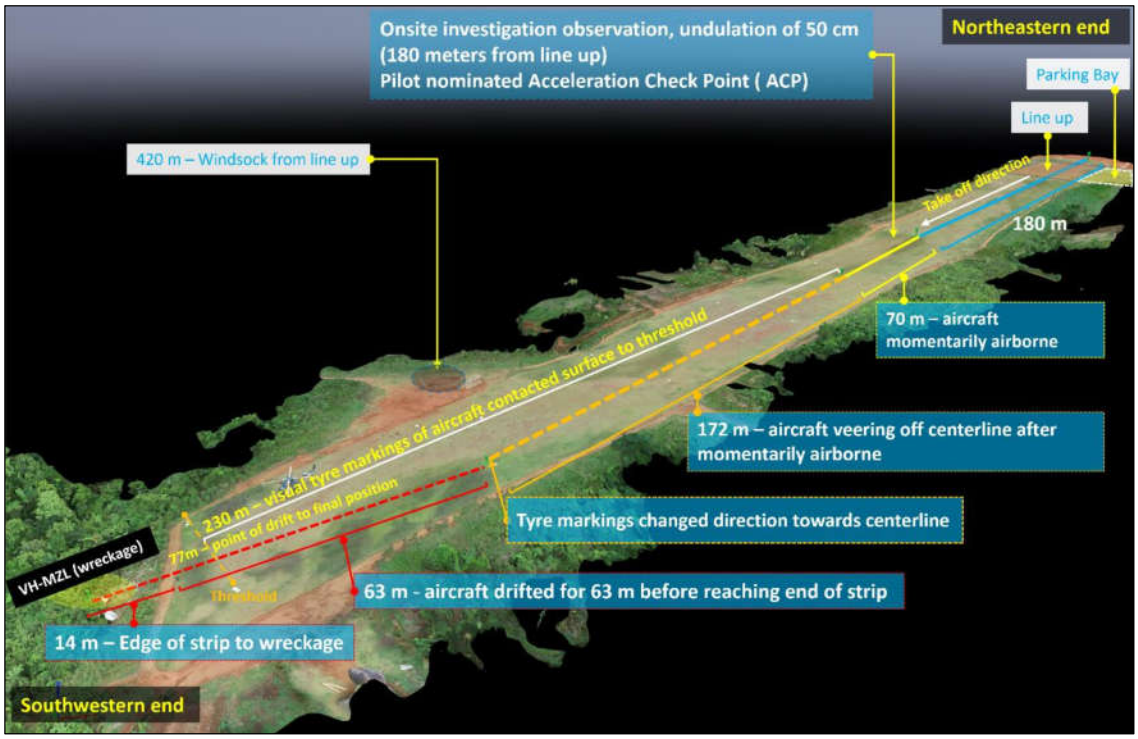


Figure 8: Accident site assessment using photogrammetry technique.

The debris and mud deposits that were found on the aircraft's tyres (refer *Figure 9*) indicated how the aircraft had drifted after the pilot initiated the ground loop to the right by applying the right landing gear brake.

Figure 9: Debris and mud deposits on the tyre indicating how the aircraft drifted during ground loop.

9 Involuntary uncontrolled turn while moving on ground, esp. during takeoff or landing, common on tailwheel aeroplanes with large ground angle, caused by directional instability; if at high speed, landing gear would normally collapse before turn had reached 180°.

1.12.1 Substantial damage

The impact forces of the accident resulted in significant damage observed on the right-hand (RH) flap, RH wing tip, left-hand (LH) leading edge, as well as damage to the propeller blade tips.

Figure 10: Damage to the aircraft.

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

According to the pilot, after the aircraft impacted the terrain and came to rest inverted, he recalled instructing the three passengers to evacuate the aircraft immediately. He stated that as they were upside down in the aircraft, he was not able to see the two aft passengers evacuating the aircraft, but only saw the passenger next to him exit the aircraft. The pilot then shut down the aircraft before exiting the aircraft to check on the three passengers.

According to the pilot and the passengers, they exited the aircraft through the right-side door. The pilot stated that he was the last to exit the aircraft and walked up to the airstrip edge, where he assessed the three passengers for injuries.

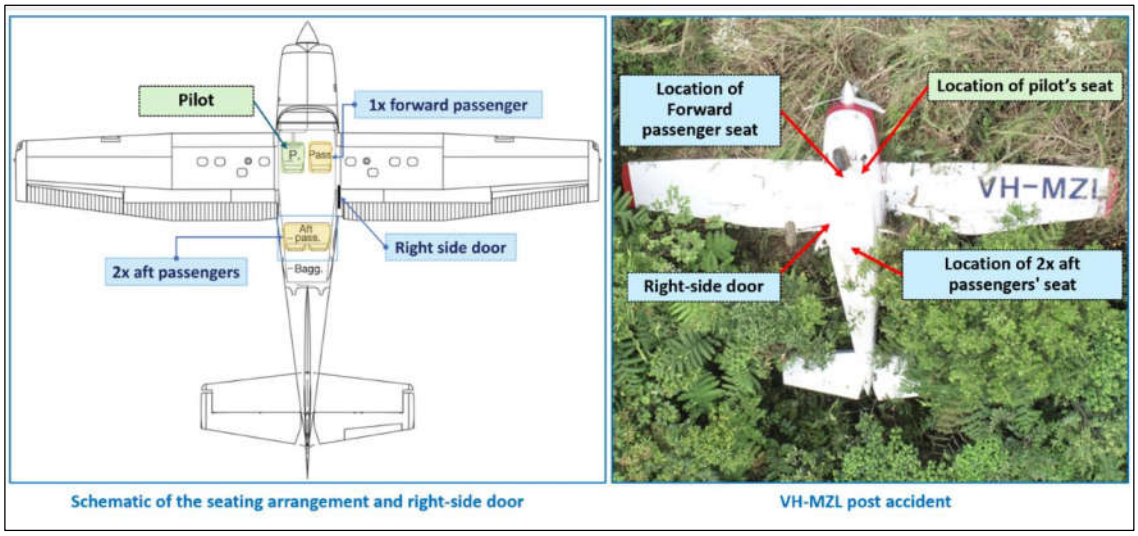


Figure 11. Schematic of the seating arrangement and the right-hand side door.

1.16 Test and research.

No test or research were required to be conducted as a result of this occurrence.

1.17 Organisational and Management Information

1.17.1 Operator

The operator, Strickland Bosavi Foundation Limited (SBFL) is a not-for-profit charitable foundation, established for the purpose of assisting local communities in development and improving access of basic services to the remote people of the Strickland and Bosavi area of Western Province, Papua New Guinea. SBFL particularly assists remote communities with airstrip development, health, and education and in supporting their own development initiatives.

According to the operator, they do not have an Air Operator Certificate (AOC) in Australia nor Papua New (PNG). They operate strictly as a private entity in Australia, and in PNG, they operate on an itinerant visiting basis. Neither state's civil aviation regulations/rules require an AOC for private operations for humanitarian work.

Maintenance is carried out by a fully licensed and CASA accredited maintenance organization in Australia.

The operator also stated that due to the private nature of their flights, they have alternate means to ensure at least equivalent safety through training and checks for the flight crew by external bodies. They also use standard Cessna Manuals and reference materials developed by SBFL.

1.17.1.1 *Acceleration Check Point and Safe Abort Point*

According to the operator's *Operations Manual*, there are provisions for selecting a Safe Abort Point (SAP) and Acceleration Check Point (ACP) along the runway prior to takeoff. Refer to *Section 5.2 Appendix B, 5.2.1* for more information.

1.17.2 Papua New Guinea Department of Transport

The PNG Department of Transport (DoT) is the lead government body responsible for transport policy,

planning and development of the transport sector, which includes all three modes of transport; land, sea and air.

1.17.2.1 *International Non-Scheduled Flight Permit*

SBFL requested through a letter dated 12 May 2023 to the Air Transport Division of DoT for their aircraft registered VH-MZL and VH-ITV to travel to Papua New Guinea. Entry would be via Daru for customs and clearance of the aircraft, and due to the suitability of the route for fuel capacity limitations of their Cessna 206 aircraft. The letter also contained details of SBFL's intended operations, while in PNG, as follows:

- *Flights carrying our aviation team, from Cairns / Horn Island to Papua New Guinea.*
- *Operations in the Strickland Bosavi Area and Western Province with some aviation safety flights into nearby locations. These will be based totally on health, education and aviation and will be supporting vaccinations and medical emergencies, as well as ensuring our remote area schools are able to begin the school year with materials and staff needed. Our aircraft are also used in support of upkeep and opening of remote area air strips and communities. Our main interest and response is in the Western Province, and into airstrips which other operators are not able to service, so we can encourage remote people to upgrade their airstrips.*
- *We also support the Western Provincial Health team and governments with medical emergency support in some of the remote locations when other services are not able to help.*
- *We will request for 2 aircrafts for multiple trips during 2023 to complete the program and include servicing and returns.*

The Air Transport Division of DoT provided AIC with a copy of an International Non-Scheduled Flight Permit, dated 3 June 2023, which they had issued to the operator, SBFL. The Permit indicated that SBFL's application to conduct a Private Ferry flight into Daru, via Horn Island, Australia, had been granted approval under *Section 201* of the *Civil Aviation (CA) Act 2000 (as amended)*, which states:

> *201. NON-SCHEDULED INTERNATIONAL FLIGHTS NOT TO BE OPERATED EXCEPT AS AUTHORIZED BY DEPARTMENTAL HEAD.*
>
> *(1) Subject to Section 200[10], no person shall operate a non-scheduled international flight between Papua New Guinea and one or more points in any country or territory, except as authorized by the Departmental Head and in accordance with such conditions as the Departmental Head may impose in accordance with guidelines specified by the Minister in accordance with Subsection (2).*
>
> *(2) For the purposes of Subsection (1), the Minister may issue guidelines to the Departmental Head for the regulation of the flights described in Subsection (1).*
>
> *(3) The Minister may from time to time review and amend the guidelines referred to in Subsection (2).*
>
> *(4) The Departmental Head shall, when requested by any person, make a copy of the guidelines issued in accordance with Subsection (2) available to that person.*

The permit also contained the Operator Details, Permit Numbers and Permit Validation. Refer to *Table 4*.

10 Holder of open aviation market licence may operate non-scheduled international flights without authorization.

Operator Details:		
Operator	Private	
Date of Operation:	Entry:	05 June 2023
	Exit:	27 June 2023
Aircraft type:	Cessna 208[10]	
Aircraft Rego/Call sign:	VH - MZL	
Departure/ Destination points:	YHID[11] *(09:30L[12])* AYDU[13] *(10:30L)* YHID *(27/06/23)*	
Flight category or/Purpose:	Private flight for services to Rural Airstrips, medical and education support in the Western Province, concentrating in the Mougulu area.	
Permit numbers	PNG/201/2023/DOT110 – Entry PNG/201/2023/DOT111 – Domestic (PNG) legs PNG/201/2023/DOT112 – Exit	
Permit Validation:	72hrs Minus/Plus permit validity.	

Table 4: Details of the International Non-Schedule Flight Permit

1.18 Additional Information

1.18.1 Flight plans for VH-MZL

Table 5 contains information on the planned and amended sectors, and the 12 sectors that the pilot operated prior to the accident flight.

Sector No.	Planned Sector Description	Amended Sector Description	Flight Time (mins)	Notes
1	Mougulu – Suabi	Mougulu - Nomad River	36	Positioning flight
2	Suabi – Debepari	Nomad River – Mougulu	18	2 x AMO 132 kg
3	Debepari – Mougulu	Mougulu – Toma	54	Positioning flight
4		Toma - Mougulu	24	2 x AMO (and school food) 220 kg
5		Mougulu – Suabi	18	Positioning flight
6		Suabi – Debepari	24	2 x AMO 132 kg
7		Debepari – Mougulu	30	4 x AMO 278 kg
8		Mougulu – Somokopa	42	Positioning flight
9		Somokopa – Mougulu	36	2 x AMO 127 kg
10		Mougulu – Yehebi	18	Positioning flight
11		Yehebi – Mougulu	18	2 x AMO 105 kg
12		Mougulu – Dodomona	18	Whacker packer, and survey drop off 165 kg

Table 5: Showing initial flight plan and amended flight plan for the accident day, 7 June 2023.

1.18.2 Winds

According to the "*FAA-H-8080-28 Aviation Weather Handbook 2022*; *Chapter 10*: *Winds, subsection 10.7 Adverse Winds*';

Gust;

> *'A gust is a fluctuation of wind speed with variations of 10 Kts or more between peaks and lulls.*
>
> *Even if the airplane is oriented into the wind, gusts during take-off and landing cause airspeed fluctuations that can cause problems for pilots. A gust increases airspeed, which increases lift, and may cause an aircraft to briefly balloon up. Once the gust ends, a sudden decrease of airspeed occurs, which decreases lift and causes the aircraft to sink. Gusty winds at the point of touchdown provide significant challenges to a safe landing.'*

Tailwind;

> *'A tailwind is a wind a component of motion from behind the aircraft.*
>
> *A tail wind can be hazardous during both take-off and landing. A longer take-off roll is necessary because a higher groundspeed is needed to generate sufficient lift, and the aircraft may roll off the end of the runway before lift-off.*
>
> *Also, a smaller initial climb gradient occurs during take-off, which may be insufficient to clear obstacles at the end of the runway. During a landing, a longer landing roll is needed because the aircraft will touchdown at a higher groundspeed. Wind should always be considered in take-off performance planning.'*

According to the pilot, he observed gusts developing during loading of the passengers and cargo at the parking bay. He further described the wind gusts to be 'not strong, blowing at 'five to eight knots.

He added that he monitored the windsock before he began his take-off ground roll and observed that it was 'still and limp' which he interpreted as safe to commit to the take-off.

It was during the take-off ground roll that he identified that the wind was now coming from behind however, he had already committed to the take-off.

1.18.3 Windsock

Following the Dodomona accident, the operator assessed the windsock and identified fault with the windsock at the site. The operator submitted a report to AIC after rectifying the defect (Refer to *4.2 Safety Actions*).

The operator stated in the report that they identified the primary fault with the windsock to be the aging timber that upholds the windsock post. As the timber deteriorated over time, the clamps of the windsock post that secure the windsock post onto the timber could no longer appropriately grip the timber. Subsequently, the windsock post became displaced by sliding down the timber resulting in the two lower arm of the windsock post coming into contact with the top of the timber. This caused the windsock pole to jam in various positions producing inaccurate indication of wind activity.

The operator reported that given the predicament of the windsock, the situation was worsened during times when the windsock captured much wind or when the windsock was wet from rain. As a result, a tailwind during landing or take-off would not be appropriately indicated by the windsock.

1.18.4 Undulation at 180 m up strip of runway 23

The undulation located at 180 m up strip was reported to be 50 cm high by an on-site airstrip surveyor. The on-site investigation observed that immediately after the 50 cm raise of the undulation, the surface immediately dips. The investigation had contacted the operator to enquire if the undulation had ever affected previous flight operations at Dodomona Airstrip. According to the operator, because of the undulation's characteristic, the undulation usually assisted the aircraft with take-off. The operator indicated that theaircraft usually achieves sufficient take-off speed once it reaches the undulation during take-off run,and usually becomes airborne at that point.

1.18.5 Legislative requirements for Foreign Registered Aircrafts Operating in PNG

Although not contributory to the accident, the AIC assessed the legal requirements surrounding this particular instance whereby DoT had issued a permit to SBFL, a foreign registered aircraft, to operate in the territory of PNG, without notifying CASA PNG who is responsible for monitoring, enhancing and promoting civil aviation safety and security in PNG.

According to Section 201A (1) of the Civil Aviation Act 2000 (as amended) (CA Act), it states that:

(1) Notwithstanding anything in Section 201[11], if CASA considers that a foreign registered aircraft possessing the nationality of a Contracting State intends, in the course of a non-scheduled flight over Papua New Guinea territory, to proceed over regions that are inaccessible or without adequate air navigation facilities, CASA may direct –

(a) that the aircraft follow an established air route; or

(b) that the flight be conducted in accordance with conditions specified by CASA.

The AIC notes that Section 201A implies that CASA PNG is supposed to be made aware of the non-scheduled flights conducted by foreign registered aircraft referred to in that Section, in order to consider whether it may or may not give directions to the concerned aircraft or flight.

In this instance, DoT had issued a permit to the foreign operator, SBFL, to conduct a non-scheduled international flight to and from the territory of PNG under *Section 201* of the CA Act, however, CASA PNG was not notified of the permit grant, and therefore, could not exercise its legal power outlined in *Section 201A*.

Additionally, *Section 66* of the *CA Act*, which outlines the legal provisions of the *Civil Aviation Registry*, states that:

(1) The Authority shall establish a Civil Aviation Registry.

(2) Copies or appropriate evidence of the following shall be recorded and maintained at the Registry:-

…

(b) every current aviation document;

...

(h) every delegation, authorization, and exemption granted in writing under this Act;

...

As interpreted by the *CA Act*, under *Section 3*, "aviation document" means:

"a licence, permit, certificate, or other document issued under this Act to or in respect of any person, aircraft, aerodrome, aeronautical procedure, aeronautical product or aviation related service;"

11 201. NON-SCHEDULED INTERNATIONAL FLIGHTS NOT TO BE OPERATED EXCEPT AS AUTHORIZED BY DEPARTMENTAL HEAD.

Furthermore, *Section 66* specifies that authorizations granted under the CA Act shall be recorded and maintained in the *Civil Aviation Registry*. Therefore, the permit that was issued to SBFL by DoT as an authorisation in accordance with *Section 201* of the CA Act, is also required under *Section 66 (b)* and *(h)* to be forwarded to CASA PNG to be recorded and maintained in the *Civil Aviation Registry*.

The AIC identified that it is implied in the *CA Act* through *Section 201A* that CASA PNG shall become aware of non-scheduled international flights to and from PNG, and any authorisations or permits issued thereunder, to enable CASA PNG to effect its mandated obligation under *Section 66*. However, in this instance, CASA PNG was not aware of the permit that was granted to SBFL by DoT.

1.19 Useful or effective investigation techniques

The investigation was conducted in accordance with the Papua New Guinea Civil Aviation Act 2000 (As Amended), and the Accident Investigation Commission's approved policies and procedures, and in accordance with the Standards and Recommended Practices of Annex 13 to the Chicago Convention on International Civil Aviation.

2 ANALYSIS

2.1 Flight Operations

The selected Acceleration Check Point (ACP) was positioned at the undulation. The ACP was found to be about a third of the length of the runway available at Dodomona. The AIC notes that the purpose of selecting an ACP is to provide a specific point during the take-off roll where the pilot can assess whether the aircraft is accelerating as desired. If the acceleration is below the expected level at the ACP, the pilot should have enough runway remaining to safely abort the take-off. In this case, when the pilot reached the ACP and observed lower-than-expected acceleration, the decision was made to abort the take-off.

As indicated by the absence of tyre marks beyond the undulation, the aircraft inadvertently became airborne. The pilot did not expect to become airborne. However, with a tailwind, the groundspeed during the take-off roll would have been higher than the observed airspeed, and considering a dip of about 50 cm, it was highly likely that the aircraft would get airborne due to the momentum of the aircraft over the dip. Because the aircraft became airborne and travelled, about 70 m before the wheels contacted the ground again, the pilot essentially lost about 70 m of runway for which the brakes would have helped decelerate the aircraft.

It was evident that the pilot was also not fully aware of the prevailing wind and runway surface conditions as he prepared for take-off.

The pilot indicated that he perceived the wind to be varying between 5-8 knots. However, the wind he felt during the take-off was more than he had anticipated. He stated that he observed the windsock after he lined up for take-off and confirmed that it was limp, which indicated to him that there was no wind blowing. However, the AIC established that the pilot was not aware that the windsock was limp because it was unserviceable. Nevertheless, the surrounding environment (trees and grass) near his line-up position would have
helped him determine the wind condition.

The AIC observed significant variations in surface conditions across the airstrip. The line-up and take-off area was relatively higher, harder and dry. This section was not characterised by other parts further down the airstrip. Beyond the undulation, the surface was generally softer and more slippery. The effective use of brakes was limited to this area, which is where the aircraft wheels contacted the ground. With about 270 m of runway remaining, and very limited traction, there was significant reduced brake effectiveness.

The AIC concluded that the pilot did not have full situational awareness which significantly affected his judgement and decision making.

The AIC also notes that the pilot did not conduct flights for over five months after his last operations within PNG between 28 November 2022 and 16 December 2022, and after a single flight that he conducted in Australia on 17 December 2022. Additionally, it had been six months since the pilot had last operated out of Dodomona Airstrip.

2.2 Acceleration Check Point and Safe Abort Point

The pilot reported that he selected an ACP where, following acceleration performance assessment, a decision to continue or abort would be made. A SAP was not selected. An ACP and SAP can coincide but are not the same thing, according to the Operator's Standard Operating Procedures. The procedures stated that the SAP is the final point where a take-off can be aborted allowing the aircraft to stop on the runway with margin remaining. The provision, however, goes on to describe that the take-off can be aborted beyond the SAP, but, it will be likely that the aircraft will overrun the runway. The AIC understands the intent of the provision which is that other unforeseen circumstance after the SAP without the desired performance, during the take-off roll can force the pilot to abort the take-off.

The ACP is primarily to check the acceleration performance and to reach a desired speed, 70 percent of the rotate speed by the nominated point. In instances where the SAP is to be appropriately selected to a point earlier in the take-off than the ACP, any acceleration related discrepancy, the provision does not discourage continuation of the take-off roll beyond the SAP implying discretion to continue to pilot to the ACP where acceleration performance is checked before a decision either to continue or to abort the take-off can be made.

Where, based on the pilot's assessment of conditions, the selected SAP is significantly closer than a nominated ACP, a decision to abort based on acceleration performance is not discouraged to be made beyond an SAP.

In the case of this accident, all the conditions listed in the Safe Abort Point Section of the Operators Manual existed. However, only an ACP was selected and the decision to abort was made at the ACP.

The standard ACP, following the operator's *Operations Manual*, is a third of the runway length by which 70 percent of the rotate or lift-off speed should be achieved. A third of the length of the runway at Dodomona would have been about 175 m by which the pilot was hoping to see an airspeed of 40 knots. The speed at that point was less than 40 knots forcing the pilot to abort takeoff. However, the undulation was at about 180 m, which contributed to the aircraft being airborne. The AIC believes that considering the prevailing surface and wind conditions, a variation was warranted.

Safety Oversight

The AIC established that CASA PNG was not aware that this Australian registered aircraft had been operating in PNG. The operator had requested from and was granted authorisation by way of a permit by the Department of Transport pursuant to *Section 201* of the *Civil Aviation Act 2000 (As Amended)*. The conditions mentioned in the permit allowed the aircraft to operate privately within the Middle Fly District area.

Section 201A of the *Civil Aviation Act 2000 (As Amended)* provides the legal provision for CASA to exercise its discretion to assess the non-scheduled flights by foreign registered aircraft of Contracting States, and provide specific directions or conditions to the operator, however, the legislation does not explicitly state who should inform CASA PNG about these non-scheduled flights by foreign operators. There is no obligation imposed by the Act on either the person or entity making the request.
Without any coordination with CASA PNG, a foreign aircraft operation may be authorized to operate without a proper safety risk assessment.

To determine the safety risks of any operation over the territory for which CASA PNG maintains safety oversight, CASA PNG needs to be aware of the intended operation. Furthermore, CASA PNG may not be able to fulfil other general safety oversight obligations imposed by the Act if it is not aware of aircraft operating in PNG.

CASA PNG's safety oversight over PNG territory is not limited to PNG registered aircraft, nor is it limited to commercially operated aircraft. Oversight applies to all aircraft operating over PNG territory, operators, airspace and airports and all document holders issued a document under the Act.

3 CONCLUSIONS

3.1 FINDINGS

1. AIRCRAFT

a) The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.

b) The investigation established that appropriate pre-flight checks of the aircraft were carried out prior to departure.

c) The aircraft had a valid Certificate of Airworthiness and had been maintained in compliance with the regulations.

d) The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.

e) The aircraft was certified as being airworthy when dispatched for the flight.

f) The mass and the centre of gravity of the aircraft were within the prescribed limits.

g) There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.

h) There was no evidence of airframe failure or system malfunction prior to the accident.

i) The aircraft was structurally intact prior to impact.

j) All control surfaces were accounted for, and all damage to the aircraft was attributable to the impact forces.

k) Propeller blade damage and twist was consistent with the engine producing power at impact.

2. CREW / PILOTS

a) The pilot was licensed and qualified for the flight in accordance with existing regulations.

b) The pilot was properly licensed, medically fit and adequately rested to operate the flight.

c) The aircraft was equipped for VFR flight,

d) The pilot was qualified for VFR flight.

e) The pilot's actions and statements indicated that his knowledge and understandingof the aircraft systems was adequate.

3. FLIGHT OPERATIONS

a) The flight was conducted without taking into consideration the necessary adjustments required for the Acceleration Check Point under prevailing conditions in accordance with the procedures in the SBFL Operations Manual.

b) The pilot carried out normal radio communications with the relevant ATC units.

c) The aborted takeoff was conducted at 175 m from the line-up point.

d) During the aborted take-off, the aircraft had already gained momentum from traveling at full power and continued over the undulation located at 180 m, just 5m after the point of aborted takeoff and became airborne.

e) The aircraft travelled 70 m while airborne.

f) The aircraft skidded and veered left of the centreline when the pilot applied brakes.

g) The pilot attempted to do a right ground loop to bring the aircraft to a stop on the airstrip, however, the aircraft drifted on for the remaining 63 m of the strip and ran off the edge of the airstrip.

h) The prevailing tailwind at the airstrip during take-off was much stronger than what the pilot had observed on the ground.

4. OPERATOR

a) The SBFL was a foreign private operator and was granted a permit by the Air Transport Division of the Department of Transport to enter PNG and conduct their humanitarian operations.

5. AIR TRAFFIC SERVICES AND AIRPORT FACILITIES

a) ATC provided communicated satisfactorily with assistance to the flight crew.

b) The windsock at the airstrip was unserviceable at the time of the accident.

6. FLIGHT RECORDERS

a) The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR); neither it required by regulation.

7. MEDICAL

a) There was no evidence that incapacitation or physiological factors affected the flight crew performance.

8. SURVIVABILITY

a) The accident was survivable.

b) The pilot and passengers did not sustain any injuries.

9. SAFETY OVERSIGHT

a) CASA PNG did not consider and assess the intended operations and, where necessary, impose conditions for safety and security pursuant to Section 201A of the Act because they were not made aware that an Australian registered aircraft (VH-MZL) had beenoperating in PNG in the period outlined in the permit.

b) The legislation (*Civil Aviation Act 2000*) does not explicitly state who should inform CASA PNG about such requests to operate private flights in PNG. There is no obligation imposed by the Act on either the person or entity making the request or the DoT.

3.2 CAUSES [CONTRIBUTING FACTORS]

The runway excursion accident was primarily caused by the pilot's nominated Acceleration Check Point (ACP) just 5 m before an undulation, and the pilot's lack of situational awareness regarding prevailing wind and surface conditions. The ACP, nominated about a third of the runway length at Dodomona, was intended to assess the aircraft's acceleration. However, upon reaching the ACP and observing lower-than-expected acceleration, the pilot decided to abort take-off. The unexpected airborne event, caused by the undulation immediately after the ACP and high groundspeed due to tailwind resulted in the aircraft losing approximately 70 meters of runway critical for deceleration.

Further contributing to the accident was the pilot's misunderstanding of the prevailing wind conditions.

Despite perceiving the wind to be varying between 5-8 knots, the actual wind during take-off was stronger than anticipated. The pilot's reliance on a limp, unserviceable windsock, and failure to use nearby trees and grass to assess wind conditions, led to incorrect judgment. This lack of awareness about wind conditions significantly impacted the pilot's decision-making during the take-off roll.

Surface conditions also played a critical role in the accident. While the initial line-up and take-off area was dry and hard, the runway beyond the undulation was softer and more slippery, limiting brake effectiveness. With approximately 270 meters of runway remaining after the aircraft's wheels touched the ground again, the limited traction hindered deceleration efforts. The pilot's selection of an ACP without also choosing a Safe Abort Point (SAP) according to the Operator’s Standard Operating Procedures further exacerbated the situation, resulting in the runway excursion.

4 SAFETY ACTIONS AND RECOMMENDATIONS

4.1 Safety Recommendations

As a result of the investigation into the accident involving the C206G aircraft, registered VH-MZL at Dodoma Airstrip, Western Province, Papua New Guinea on 7 June 2023, The Papua New Guinea Investigation Commission issued a safety recommendation to address a concern identified in this report.

4.1.1 Recommendation number AIC 24-R03/23-1004 to Strickland Bosavi Foundation Limited

Date issued: 11 June 2024

The PNG Accident Investigation Commission recommends that the Strickland Bosavi Foundation Limited should ensure that its pilots are familiarised with the different conditions and characteristic of airstrips that SBFL operates to, as well as the appropriate actions required for safe operations to those airstrip.

Action requested

The AIC requests that the Strickland Bosavi Foundation Limited note recommendation *AIC 24-R03/23-1004* and provide a response to the AIC within 90 days of the issue date, but no later than *8 September 2024* and explain including with evidence how Strickland Bosavi Foundation Limited has addressed.

4.1.2 Recommendation number AIC 24-R04/23-1004 to Department of Transport

The PNG Accident Investigation Commission (AIC) recommends that the Department of Transport should ensure effective coordination of requests and permits for non-scheduled foreign aircraft flights into and around PNG with the Civil Aviation Safety Authority of PNG as soon as practicable.

Action requested

The AIC requests that the Department of Transport note recommendation *AIC 24-R03/23-1004 and* provide a response to the AIC within 90 days of the issue date, but no later than 8 September 2024 and explain including with evidence how DoT has addressed the safety deficiency identified in the safety recommendation.

4.2 Safety Actions

During the investigation, the operator informed AIC of the safety actions taken and proposed following the accident. On 22 June 2023, the operator notified the AIC of the safety actions taken in relation to the accident, with assistance from locals and the RAA, by submitting a report via email.

4.2.1 Rectification of faulty windsock at the Southwestern end (approach end) of airstrip.

The jammed windsock arm was raised to the top of the windsock post (pole). This was achieved by moving the two clamps (bottom and top) up the post and correcting the position on the pole. A nail was

then nailed below the bottom clamp to ensure the clamp does not slip down. Additional fix was the greasing of the rotating parts of the windsock.

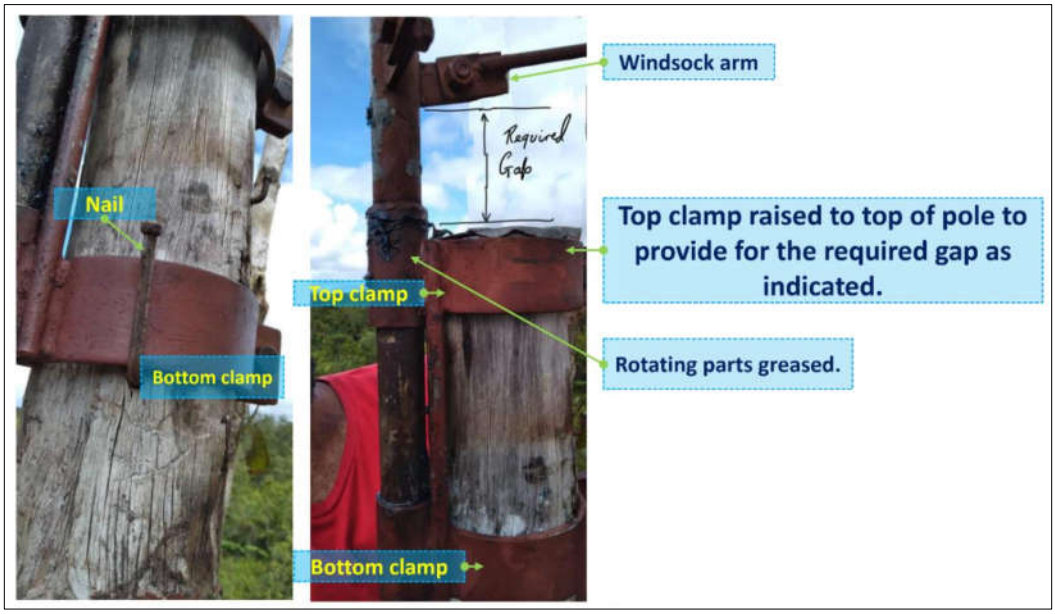


Figure 12. Rectification of faulty windsock.

4.2.2 Installation of new windsock at the Northeastern end near the line up and parking bay.

A new windsock had been installed opposite the parking bay, at the Northeastern end of the airstrip about 40 meters from the line up.

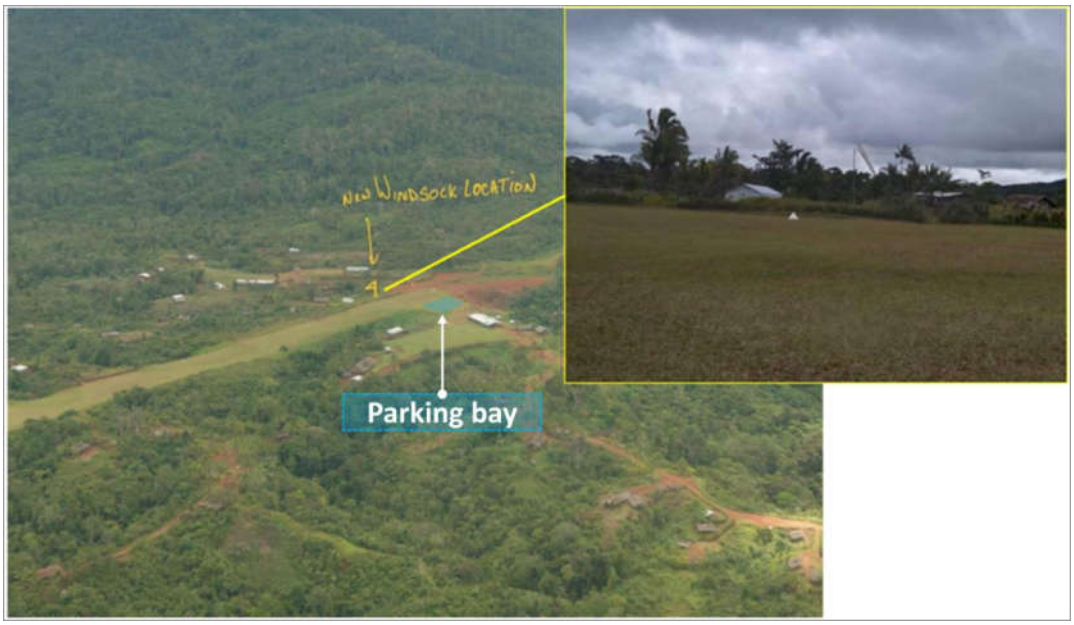


Figure 13. Dodomona Airstrip showing the newly installed windsock near the parking bay.

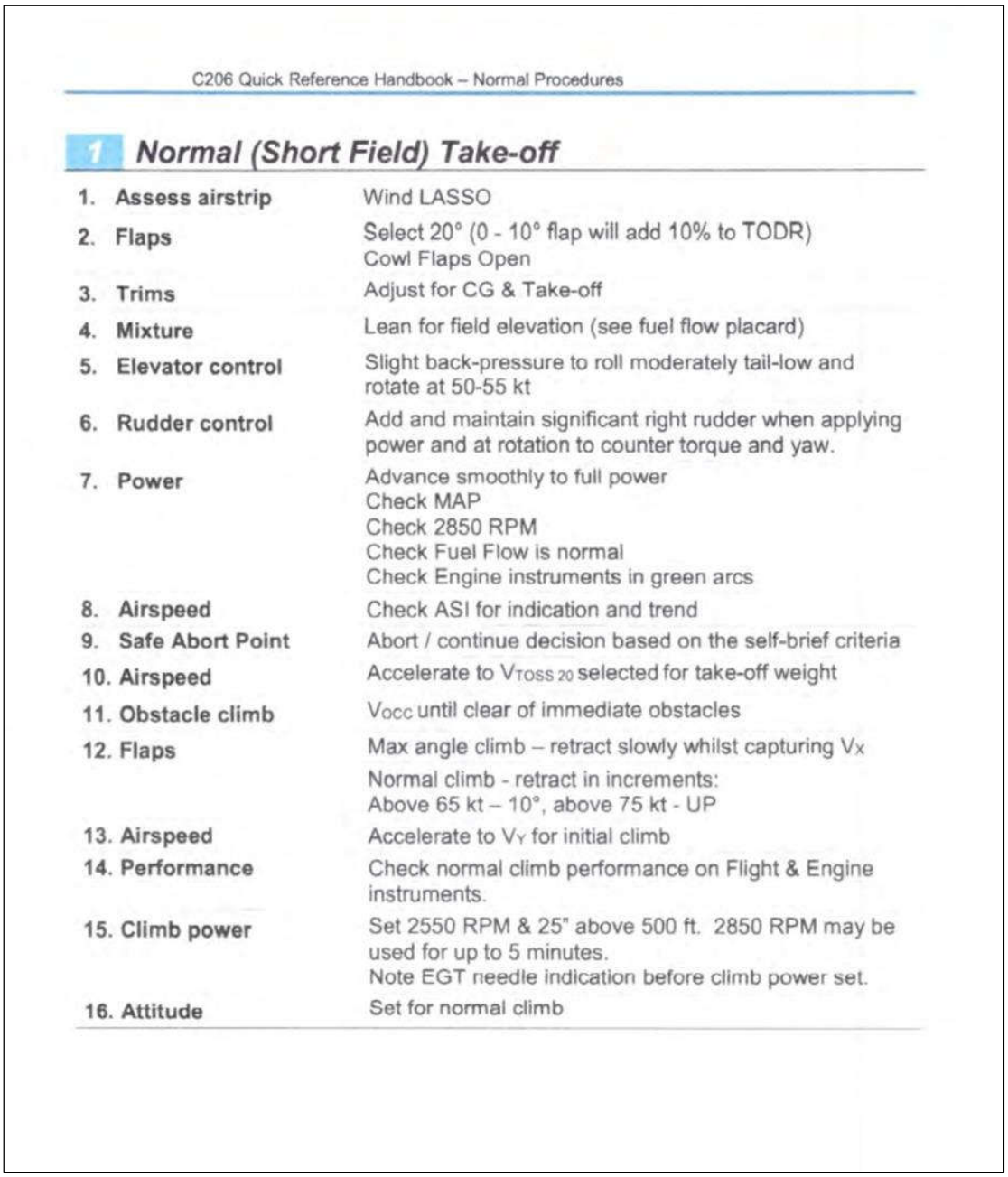
Both windsocks were tested and found to be serviceable.

The location of the windsocks was to enable pilots to see both before commencing a take-off roll.

5 APPENDICES

5.1 Appendix A: C206 Quick Reference Handbook

5.1.1 Normal (Short Field) Take-off Procedures

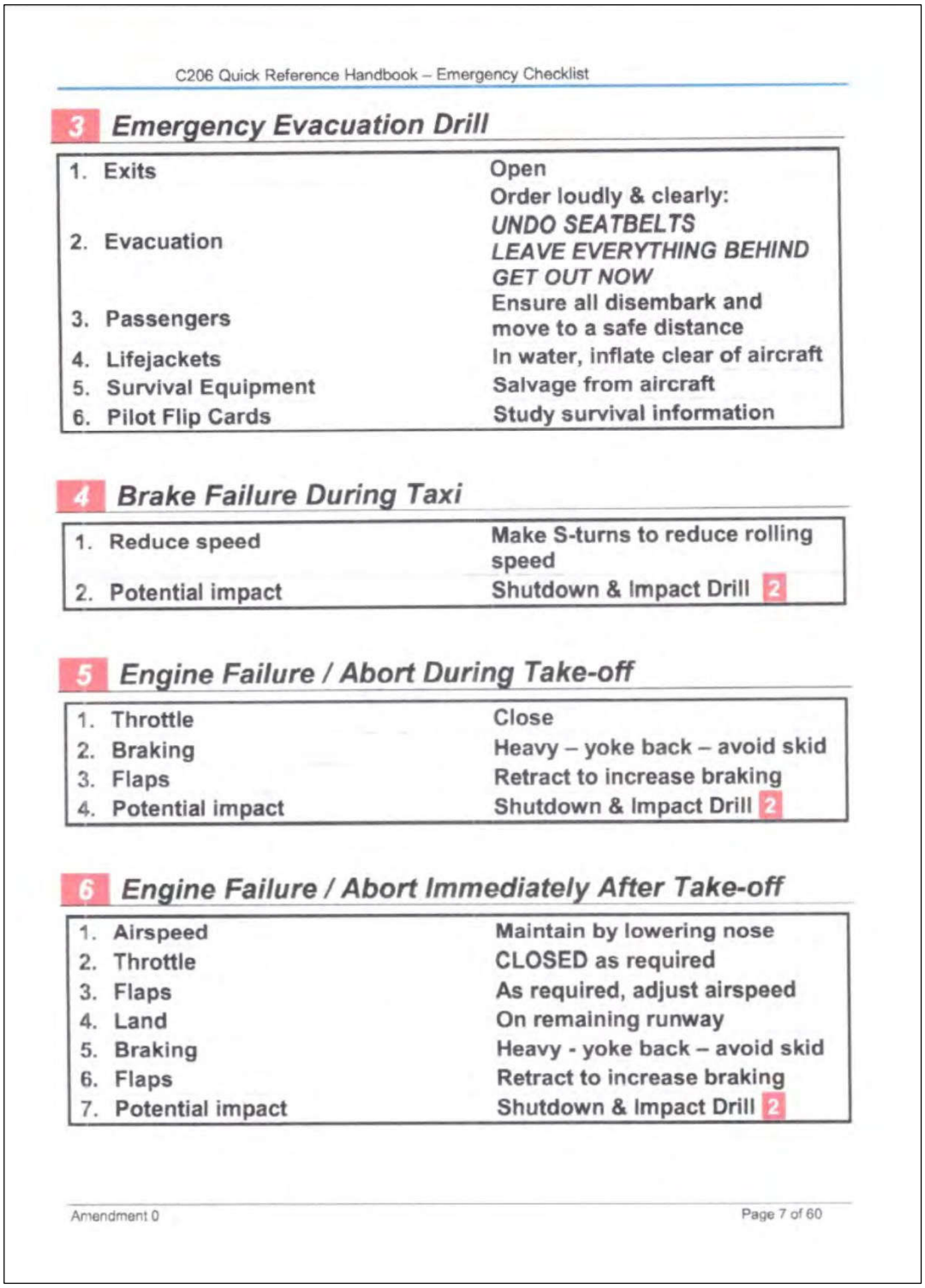


C206 Quick Reference Handbook – Normal Procedures

1 Normal (Short Field) Take-off

1. **Assess airstrip**	Wind LASSO
2. **Flaps**	Select 20° (0 - 10° flap will add 10% to TODR) Cowl Flaps Open
3. **Trims**	Adjust for CG & Take-off
4. **Mixture**	Lean for field elevation (see fuel flow placard)
5. **Elevator control**	Slight back-pressure to roll moderately tail-low and rotate at 50-55 kt
6. **Rudder control**	Add and maintain significant right rudder when applying power and at rotation to counter torque and yaw.
7. **Power**	Advance smoothly to full power Check MAP Check 2850 RPM Check Fuel Flow is normal Check Engine instruments in green arcs
8. **Airspeed**	Check ASI for indication and trend
9. **Safe Abort Point**	Abort / continue decision based on the self-brief criteria
10. **Airspeed**	Accelerate to $V_{TOSS\ 20}$ selected for take-off weight
11. **Obstacle climb**	V_{OCC} until clear of immediate obstacles
12. **Flaps**	Max angle climb – retract slowly whilst capturing V_X Normal climb - retract in increments: Above 65 kt – 10°, above 75 kt - UP
13. **Airspeed**	Accelerate to V_Y for initial climb
14. **Performance**	Check normal climb performance on Flight & Engine instruments.
15. **Climb power**	Set 2550 RPM & 25" above 500 ft. 2850 RPM may be used for up to 5 minutes. Note EGT needle indication before climb power set.
16. **Attitude**	Set for normal climb

5.1.2 Engine Failure/Abort During Take-off Emergency Checklist



3 Emergency Evacuation Drill

1. Exits	Open
2. Evacuation	Order loudly & clearly: *UNDO SEATBELTS* *LEAVE EVERYTHING BEHIND* *GET OUT NOW*
3. Passengers	Ensure all disembark and move to a safe distance
4. Lifejackets	In water, inflate clear of aircraft
5. Survival Equipment	Salvage from aircraft
6. Pilot Flip Cards	Study survival information

4 Brake Failure During Taxi

1. Reduce speed	Make S-turns to reduce rolling speed
2. Potential impact	Shutdown & Impact Drill 2

5 Engine Failure / Abort During Take-off

1. Throttle	Close
2. Braking	Heavy – yoke back – avoid skid
3. Flaps	Retract to increase braking
4. Potential impact	Shutdown & Impact Drill 2

6 Engine Failure / Abort Immediately After Take-off

1. Airspeed	Maintain by lowering nose
2. Throttle	CLOSED as required
3. Flaps	As required, adjust airspeed
4. Land	On remaining runway
5. Braking	Heavy - yoke back – avoid skid
6. Flaps	Retract to increase braking
7. Potential impact	Shutdown & Impact Drill 2

5.2 Appendix B: Operations Manual Part B – C206

5.2.1 Safe Abort Point and Acceleration Check Point

2.11.1. Safe Abort Point

For each take-off a Safe Abort Point along the runway should be selected. Its purpose is to provide the pilot with a final decision point to abort the take-off, from which the aircraft should still be able to stop on the runway with margin remaining.

Note *It is still possible to abort a take-off beyond the SAP, but the aircraft will almost certainly overrun the runway – there will be no margin.*

For a firm, dry and level runway the SAP will be less than halfway along the runway length - for long runways this could be when already airborne.

The SAP should be adjusted accordingly to maintain an appropriate margin:

a. when taking off on a runway that is soft, wet or sloped,

b. where the runway surface is less than ideal for braking,

c. where environmental conditions predict a tailwind, windshear, etc.,

d. when lack of pilot currency or recency is a factor.

In certain conditions, e.g. steep or slippery downslopes, the SAP may be the brakes release point at the start of the take-off roll.

2.11.2. Acceleration Check Point

For each take-off an Acceleration Check Point should be nominated. This provides a decision point during the take-off roll to confirm the acceleration of the aircraft is adequate for the take-off to continue. It is not to be confused with the Safe Abort Point.

The ACP is a tool to confirm that the surface conditions have been correctly assessed, that the correct technique is being used for those surface conditions, and that there is no gross error in the take-off weight calculation.

The pilot should estimate the likely point on the runway where the aircraft will become airborne (TORR). The ACP position is nominated as half of this estimated length. The ACP guide distances below should be adjusted for surface conditions, elevation, slope and wind. On a marginal length airstrip, the ACP should be no further than one third of the take-off roll available (TORA).

During the take-off roll the aircraft should achieve 70% of V_R by the ACP. If performance is inadequate at the ACP then the take-off roll should be aborted, or action taken in accordance with the pre take-off safety brief.

Take-off Weight	70% of V_R by ACP	ACP = 50% TORR^	
		Straight Wing	STOL Wing
1633 kg	42 KIAS	170 m	130 m
1600 kg	41 KIAS	160 m	125 m
1500 kg	40 KIAS	140 m	115 m
1400 kg	39 KIAS	120 m	105 m
1300 kg	38 KIAS	110 m	100 m
1200 kg	37 KIAS	100 m	95 m

^ Distance calculated for Sea Level performance at 30 °C, on level short dry grass, and increases by 10% per 1000 ft increase in elevation.

When the airstrip characteristics require an early SAP, the ACP may possibly be beyond the SAP. In this situation, surface condition should be assessed by other means, and, when practical, an engine performance check at full power should be performed prior to brakes release.

2.11.3. Take-off Power Check

On every take-off, the engine performance shall be assessed with Take-off Power set. If the pilot has concern about the engine performance, and the SAP has not been passed, the take-off shall be aborted for an investigation of the problem.

The Take-off Power Check should confirm that the following engine parameters are normal for take-off with Take-off Power set in the ambient conditions:

a. oil temperature and pressure,

b. fuel flow

c. CHT and EGT trends

d. RPM

e. manifold pressure

f. fuel pressure

Most of the above parameters are readily presented or alerted on the engine monitoring system, therefore, a glance at the EMS may be included in the decision to continue past the SAP.

A static check is recommended on the first take-off of the day to allow an unhurried scan of the parameters and allow engine temperatures to respond. However, if during a static check the aircraft begins to slide with indications and trends appearing normal, the brakes should be released and the take-off commenced.

5.2.2 Cessna U206G Weight Limits

WEIGHT LIMITS

Maximum Ramp Weight: 3612 lbs.
Maximum Takeoff Weight: 3600 lbs.
Maximum Landing Weight: 3600 lbs.
Maximum Weight in Baggage Compartment - Station 109 to 145: 180 lbs.

NOTE

Refer to Section 6 of this handbook for loading arrangements with one or more seats removed for cargo accommodation.

CENTER OF GRAVITY LIMITS

Center of Gravity Range:
Forward: 33.0 inches aft of datum at 2500 lbs. or less, with straight line variation to 42.5 inches aft of datum at 3600 lbs.
Aft: 49.7 inches aft of datum at all weights.
Reference Datum: Lower portion of front face of firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:
*Flaps Up: +3.8g, -1.52g
*Flaps Down: +2.0g

*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

5.3 Appendix C: Civil Aviation Act 2000 (As Amended) Abstract

(4) The Departmental Head shall, when requested by any person, make a copy of the guidelines issued in accordance with Subsection (2) available to that person.

201A. NON-SCHEDULED FLIGHTS BY FOREIGN REGISTERED AIRCRAFT.[157]

(1) Notwithstanding anything in Section 201, if CASA considers that a foreign registered aircraft possessing the nationality of a Contracting State intends, in the course of a non- scheduled flight over Papua New Guinea territory, to proceed over regions that are inaccessible or without adequate air navigation facilities, CASA may direct -

(a) that the aircraft follow an established air route; or

(b) that the flight be conducted in accordance with conditions specified by CASA.

(2) Where a foreign registered aircraft possessing the nationality of a Contracting State makes a non-scheduled flight into Papua New Guinea territory, it shall not take on or discharge passengers, cargo or mail in Papua New Guinea territory (being passengers, cargo or mail carried, or to be carried, for reward) except with the permission of CASA and in accordance with any conditions to which the permission is subject.

(3) A foreign registered aircraft, not possessing the nationality of a Contracting State, shall not make non-scheduled flight over or into Papua New Guinea territory except with the permission of CASA and in accordance with any conditions to which the permission is subject.

(4) If a person applies to CASA for a permission under Subsection (2) or (3), CASA shall grant the permission if CASA is satisfied that the person has complied with, or is capable of complying with -

(a) the condition referred to in Paragraph (5)(*a*) (if applicable); and

(b) in any case - the safety rules.

(5) A permission granted under Subsection (2) or (3) is subject to -

(a) the condition that Section 49 of the ***Civil Aviation (Aircraft Operators' Liability) Act* 1975** (which deals with compulsory insurance) is complied with (if applicable); and

(b) any conditions specified in the permission.

(6) CASA shall not do either of the following, except to ensure compliance with the safety rules -

(a) specify a condition under Paragraph (5)(*b*); or

(b) vary a condition specified under Paragraph (5)(*b*).

(7) CASA shall not suspend or cancel a permission granted under Subsections (2) or (3), except -

(a) if the condition referred to in Paragraph (5)(*a*) is not complied with; or

(b) to ensure compliance with the safety rules.

(8) All directions or permissions issued under this section by CASA shall be in writing signed by the Director or a person exercising delegated authority under Section 43.

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[157] Section 201A inserted by No. 33 of 2016, s30.