



PRELIMINARY REPORT

AIC 18-1003

NEW TRIBES MISSION

P2-NTZ

Quest Kodiak 100

NOSE WHEEL SEPARATION ON LANDING

MIBU AIRSTRIP, MADANG PROVINCE

PAPUA NEW GUINEA

09 AUGUST 2018

About the AIC

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

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

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

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

It is not a function of the AIC to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the AIC endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why it happened, in a fair and unbiased manner.

About this report

The Papua New Guinea Accident Investigation Commission (AIC) was informed of the accident on the morning of 9 August 2018. The initial information indicated a propeller strike and as that does not constitute an accident in accordance with ICAO Annex 13 Standards, no AIC investigation was proposed. The AIC subsequently received a report detailing substantial damage to the propeller, engine, nose landing gear, and the associated airframe. The AIC immediately commenced an office investigation. The operator is assisting the AIC's investigation.

This Preliminary Report, made publicly available on 7 September 2018, was produced by the AIC, PO Box 1709, Boroko NCD, Papua New Guinea.

The report is based upon the office investigation carried out to date, by the AIC, in accordance with *Annex 13 to the Convention on International Civil Aviation*, the PNG Civil Aviation Act 2000 (as amended), and the AIC Investigation Policy and Procedures. It contains only factual information on the accident and does not contain analysis of that information.

Aircraft bogged during landing roll - Nose landing gear failure

Occurrence details

On 9 August 2018, a Quest Kodiak 100 aircraft, registered P2-NTZ, owned and operated by New Tribes Mission (NTM), was flown to the newly built Mibu airstrip (5° 48' 39" S, 146° 22' 24" E), in Madang Province. It was to be the first landing at the newly constructed airstrip. There were two NTM pilots on board; a pilot in command (PIC) and an observer pilot.

At about 23:25 UTC¹, during the landing roll, the aircraft's nose wheel sank into a soft patch on the strip surface. The aircraft came to an abrupt stop and the nose-wheel fork fractured on both sides of the oleo attachment plate resulting in the nose-wheel and nose-wheel fork assembly separating from the oleo. The pilots, the sole occupants, were not injured.



Figure 1: P2-NTZ at Mibu Airstrip showing wheel tracks in strip soft surface

The nose of the aircraft dropped as the fork separated from the oleo and dug further into the soft ground until the bottom of the engine cowling was on the ground (See figure 2).

The PIC stated that he added power soon after touching down to maintain a 20kt speed up the 17% slope towards the end of the strip. The engine and propeller, under significant power, were substantially damaged as they impacted the ground.

The pilots reported that they had earlier that day received a strip report and learned that it was dry and suitable for a landing. On arrival over Mibu Airstrip the PIC flew down the strip in the take-off direction to conduct an aerial inspection of the strip surface. They subsequently reported that they did not observe any standing water, mud or cracks on the strip surface. They then conducted two circuits terminating in go-arounds for approach profile planning.

The first landing from the third approach and the subsequent takeoff were completed successfully. However, the pilots reported that they both noted two soft spots during the landing roll and that the aircraft decelerated quickly and some extra power was needed to continue momentum up the hill. The subsequent takeoff was normal and the aircraft became airborne prior to that soft area.

During the next landing roll the aircraft's nose wheel sank into the soft surface of the strip and became bogged. Subsequent substantial damage included the nose-landing gear, propeller, engine and cowling.

¹ The 24-hour clock is used in this report to describe the local time of day, Local Mean Time (LMT), as particular events occurred. Local Mean Time was Coordinated Universal Time (UTC) + 10 hours.



Figure 2: View of P2-NTZ showing the ruts in the soft strip surface from the first takeoff



Figure 3: Nose wheel and fork assembly in bog hole Figure 4: Propeller assembly

During July 2018, NTM personnel accompanied by a Geologist from the Rural Airstrips Agency (RAA) had flown to Mibu Airstrip by helicopter and conducted a detailed inspection of the strip. The Geologist's report included that drainage needed to be constructed on both sides of the strip. Continuous [water runoff] flow has the potential to cause erosion inwards onto the strip. Sub-surface strength needs further work to strengthen it. The report provided brief examples of how that could be achieved. The report also stated that the surface can be intermixed with sand or gravel to provide some traction, cohesion, strength and durability.

The AIC sent the fractured nose landing gear fork assembly to the Australian Transport Safety Bureau in Canberra, Australia for materials failure analysis in the ATSB's Engineering Laboratory. The examination of the failed components will seek to establish the mode of failure.

The investigation is continuing and will include a detailed review of the Rural Airstrips Agency report into Mibu Airstrip, and a metallurgical examination of the failed nose-wheel fork assembly.

Safety action

Rural Airstrips Agency (RAA) safety action

On 5 September 2018 the AIC received the following safety action statement from the Rural Airstrips Agency:

Following the accident at Mibu airstrip, the RAA has reviewed their internal procedures for producing and releasing technical airstrip reports. The procedures have now been amended to ensure both geological and civil engineering input is incorporated into the reports as applicable, and the reports are reviewed to ensure the technical input results in clear and concise recommendations that can be clearly understood by the general aviation public.

New Tribes Mission (PNG) Ltd., (NTM) safety action

On 6 September 2018 the AIC received the following safety action statement from New Tribes Mission (PNG) Ltd covering the steps NTM is taking following the accident:

- *Reviewing and revising the airstrip assessment procedure given in our international Operations Manual.*
- *Enhancing exercises in airstrip survey techniques.*
- *Establishing a more formal, structured approval process for the opening of new airstrips in bush locations, to include engagement with the senior persons team, completion of a risk assessment, etc.*

While we work through those more procedural steps as we look to the future, we are also taking steps to ensure the Mibu airstrip is safe for further operations.

On 24 AUG 2018 NTM PNG sent two personnel into the Mibu airstrip via helicopter in order to perform a reassessment of the airstrip's surface and substrate strength using the procedure currently documented in our headquarter's international Operations Manual. The centre 9m of the airstrip was assessed along its full length. For the assessment the assessors used four rows of test points equally spaced at 3m along the length and width of the test area. The identified an area unfit for landing based on the surface and substrate strength. This area is an approximately 72m section of the airstrip, beginning 6m prior to the 8th edge marker from the approach end and stretching 6m past the 10th edge marker (markers placed at 30m intervals). The mishap aircraft came to rest in the middle of this section.

Based on the above assessment we have provided feedback to the local village leaders regarding the area marked out as unacceptable and have given them further guidance as to what needs to be done to rectify the unacceptable conditions. The people there have been very receptive to our input and have been working diligently to repair/improve the airstrip surface.

Related to the rework of the strip and the recommendation of the RAA was our direction to the Mibu people to move the edge markers in 10m from their current positions on the far edges of the 42m wide strip. This will provide the required overrun/excursion area outside the markers and allow the people to focus their current efforts and long-term maintenance activities on the critical area of the airstrip.

Additionally, we have engaged the RAA in dialogue regarding some questions we have now as we reflect on the report and ways we could improve the communication of data and potential.

PNG AIC Comment.

The AIC has reproduced these Safety Action Statements in order that they may assist other communities that are building rural airstrips to better understand the safety issues associated with airstrip construction.

General Details

| | | |
|--------------------------|---|---------------------------|
| Date and time: | 8 August 2018 23:32 UTC | |
| Occurrence category: | Accident | |
| Primary occurrence type: | Aircraft Nose wheel bogged with fork broke off with the wheel | |
| Location: | Mibu Airstrip | |
| | Latitude: 5° 48' 39" S | Longitude: 146° 22' 24" E |

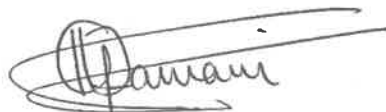
Crew details

| | |
|------------------------|-----------|
| Nationality | USA |
| Licence type | ATP (PNG) |
| Licence number | P22077 |
| Total hours | 9,563 |
| Total hours in Command | 9,272 |
| Total hours on type | 1,031 |

Aircraft Details

| | | |
|----------------------------------|---|------------------------------|
| Aircraft manufacturer and model: | Quest Kodiak 100 | |
| Registration: | P2-NTZ | |
| Serial number: | 100-0118 | |
| Engine manufacturer and model | Pratt & Whitney Canada PT6A-34 | |
| Engine serial number | PCE-RB0780 | |
| Propeller manufacturer and model | Hartzel HC-E4N-3P | |
| Propeller serial number | HH4907 | |
| Type of operation: | Private flight. Newly constructed airstrip proving flight | |
| Persons on board: | Crew: 1 PIC | Passengers: 1 Pilot observer |
| Injuries: | Crew: Nil | Passengers: Nil |
| Damage | Nose wheel fork fractured and separated from oleo; propeller destroyed; engine and cowling substantially damaged. | |

Approved



Hubert Namani, LLB

Chief Commissioner

7 September 2018