ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT

AIC 17-1001

SHORT SUMMARY REPORT

Niugini Helicopters

P2-HSE

Bell Helicopters Model 407

Helicopter impacted aerodrome apron during takeoff

Kiunga Aerodrome, Western Province

PAPUA NEW GUINEA

15 February 2017

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 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

Decisions regarding whether to conduct an investigation, and the scope of an investigation, were based on many factors, including the level of safety benefit likely to be obtained from the investigation. For this occurrence, a full on-site, fact-gathering investigation was commenced. As the helicopter was destroyed the occurrence was classified as an accident. This Report has been produced in accordance with the PNG Civil Aviation Act 2000 (as amended), ICAO Annex 13 to the Chicago Convention on International Civil Aviation, and the PNG Accident Investigation Commission’s Policy and Procedures.

Helicopter impacted aerodrome apron during takeoff

Occurrence details

On 15 February 2017, at approximately 05:00 UTC[1] (15:00 local), the pilot of a Bell Helicopters Model 407 helicopter, registered P2-HSE, owned and operated by Niugini Helicopters, was commencing a normal translational-lift takeoff, to the south-south west, across the aerodrome apron, and over the terminal buildings. The flight was a VFR[2] charter operation carrying two passengers to a Digicel tower site, 20 nm south of Kiunga Aerodrome.

The pilot reported that when the helicopter was about 100 ft AGL and at a speed (IAS)[3] about 30 or 40 kts, it suddenly jerked to the left, rapidly descended, and impacted the tarmac, and was destroyed. The pilot and both passengers sustained minor injuries.

A 50 m longline attached to a net carrying three full 200 L metal drums containing diesel fuel, was 'attached'[4] to the helicopter. A significant quantity of fuel spilled from one drum during the impact. There was no significant damage to aerodrome infrastructure.

During the interview with the AIC, the pilot stated that he brought out the longline and authorised the non-NGH personnel to load the drums into the net. He said he gave them instructions on how to load them, stating that they should put the drums upright. He said that he was unaware that the longline that he and the passengers had prepared for the next flight to the same location, was attached to the helicopter prior to lift-off.

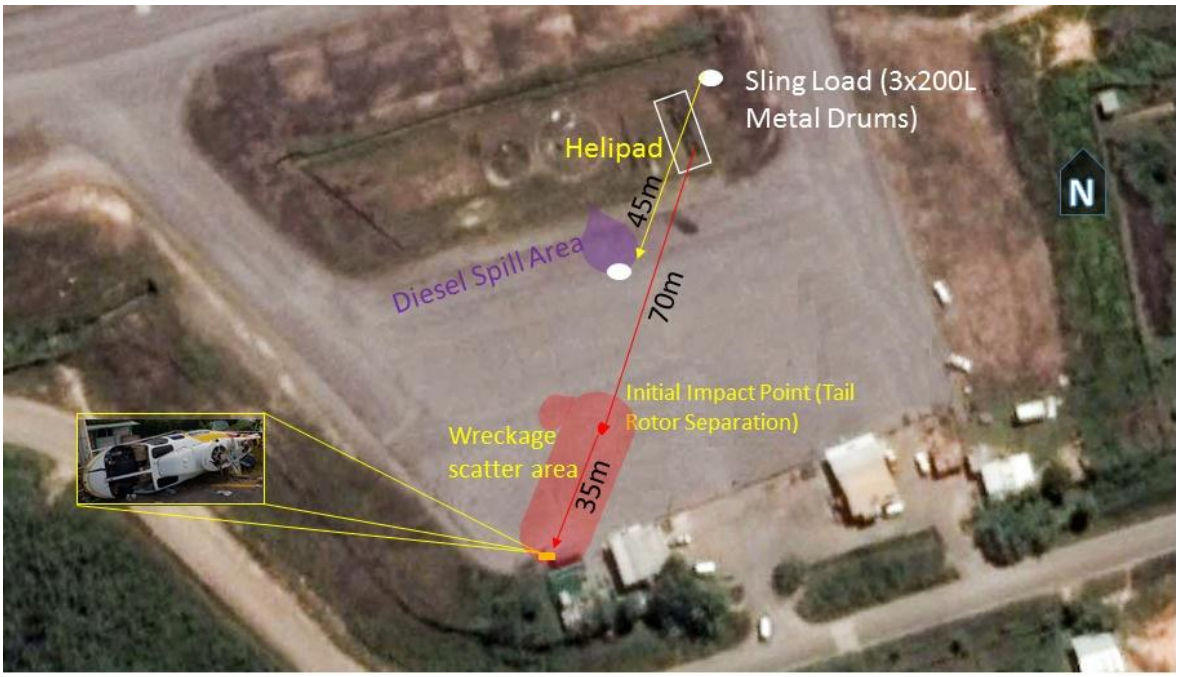


Figure 1: Aerial view of occurrence area

[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
[3] Indicated Air Speed
[4] The method of attachment was not conclusively determined at the time of the on-site investigation.

The investigation determined that the tail boom separated at the initial ground-impact area. The fuselage came to rest against the railing around the light pole at the southern end of the apron, 35 m from the point where initial impact marks were found, 105 m from the helipad (See Figure 1).

Figure 2: Final position of fuselage

Figure 3: Helicopter Belly

Figure 4: Fuel spill on the aerodrome apron

Figure 5: Separated landing gear skid assembly

Background

Kiunga is a port town on the Fly River in the Western Province of Papua New Guinea. It is the hub for local industry and the route for freight and haulage, particularly from the Ok Tedi Mine at Tabubil, 52 nm (96 km) north of Kiunga. The Kiunga Airport is a relatively busy airport averaging 50 flights a day.

Pilot

The pilot held a valid foreign ATPL(H), PNG CPL(H) and a valid Class 1 Medical Certificate, without restrictions. He was qualified for sling operations, and had been employed by the operator on rotation with another company pilot based in Kiunga for about two years. The Kiunga pilots conducted sling operations as a routine activity.

The pilot reported that he did his pre-flight checks before the passengers had stowed their cargo and loaded the drums into the net. He then drove his operational truck out of the apron area to the carpark, and walked back to the helicopter. He stated that all ground preparation work had been completed prior to moving the truck, and one of the passengers was already seated in the left front seat when he arrived back at the helicopter. The other passenger was just about to board when he arrived. The pilot stated he walked to the baggage compartment to check how the boot was loaded. He did not do any further external checks.

The pilot stated that the two passengers flew regularly with him and would have been familiar with the ground operations and handling, and he always supervised them while they carried out ground work for the operator.

The pilot's opinion was that the line was hooked onto the belly hook by one of the passengers without his knowledge.

Passengers

The two passengers on-board were R&A Marine Services employees, which was under contract to provide technical services at Digicel tower sites.

One of the passengers was the service/maintenance technician for R&A Marine Services. The pilot reported that this passenger did not usually assist with the ground work. The other passenger, a Kiunga local, was the technician's assistant, and his job was to carry tools and equipment for the technician. He assisted the pilot by loading the drums in the net and rigging it. He had little education and was barely literate in English.

The Kiunga local would always assist by loading the fuel drums in the nets for sling operations. Investigators could not contact him during the first 48 hours after the accident. He reportedly fled the accident scene and the airport area.

When he was found 3 days later and interviewed, he stated that he had not hooked the line to the helicopter, and that it was not on the hook at all. He stated that he had thrown the line under the helicopter and notified the pilot that the line was running over the skid to which he said the pilot replied, "thanks for reminding me".

Aircraft

The helicopter was destroyed and debris from the wreckage lay across the apron (Fig 1). The tail boom separated from the helicopter, and the tail rotor was destroyed as a result of the rotor blades striking the ground with high rotational energy. The main rotor blades were also destroyed as they struck the ground, and a shipping container adjacent to the helicopter's final resting point. Large pieces of the helicopter were removed before the investigators arrived.

The AIC investigators arrived at the accident site at 06:00 on 16 February 2017. The investigators had to rely heavily on ground marks, witness statements, and to an extent traces of tiny debris still remaining after the clean-up.

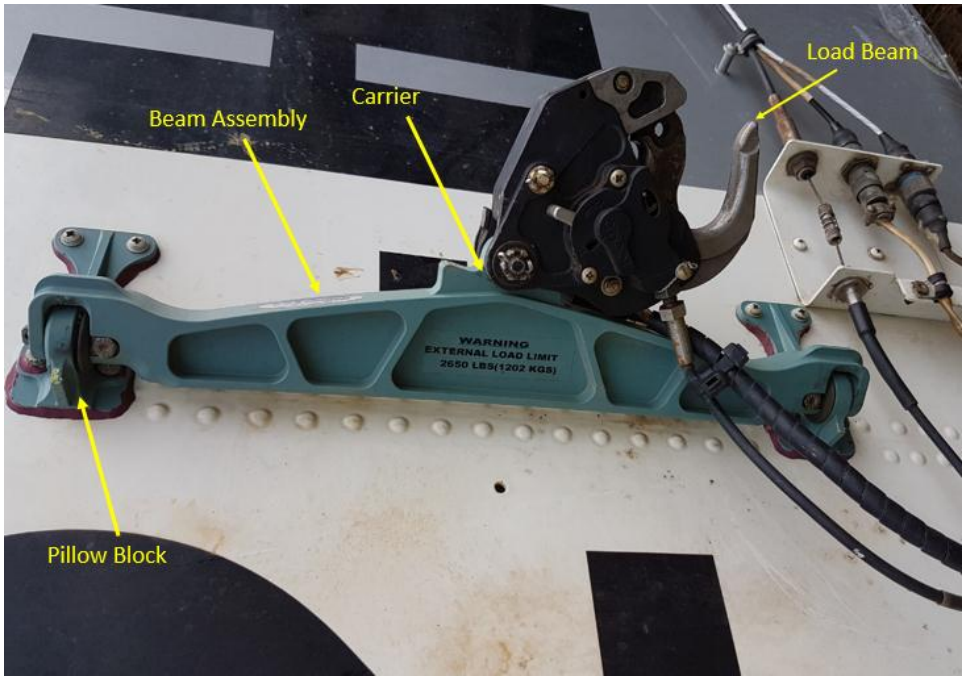


Figure 6: On-board Systems Cargo-Hook Suspension System

The Helicopter was fitted with an On-board Systems Cargo-Hook Suspension System. The beam assembly had a weight limit of 1202 kg, while the load beam had a weight limit of 1632kg. None of these components, or any associated helicopter mounted sling operation equipment were found to be damaged. The mounting area appeared intact. There was no airframe distortion, and the adhesive between the pillow blocks and the fuselage was undisturbed. The aircraft was fitted with a load meter at the centre of the left instrument panel. The pilot stated that he paid no attention to it during start-up and takeoff, because it was not a sling operations flight.

The investigation sought and obtained expert assessment of the sling equipment from the Australian Transport Safety Bureau's materials failure engineers. They found no evidence of equipment failure or damage.

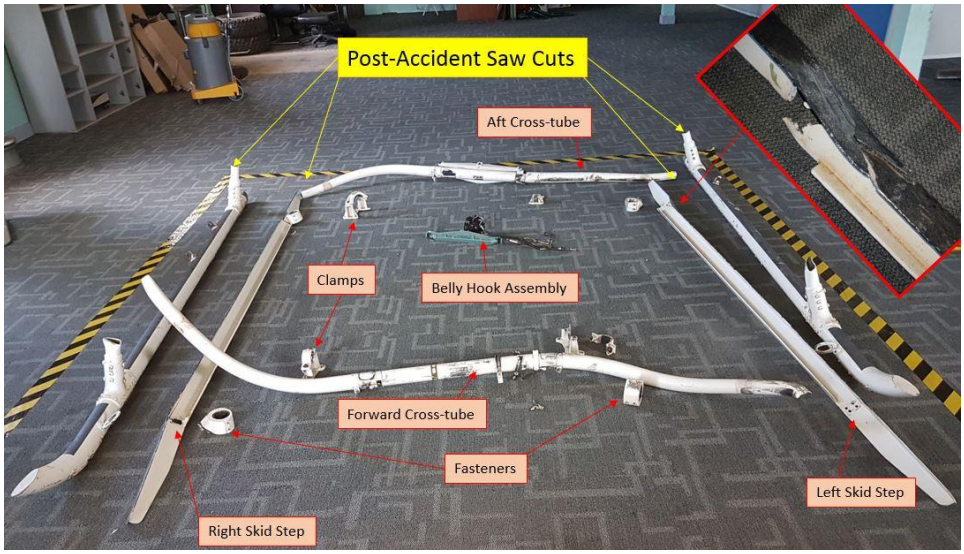


Figure 7: On-board Systems Cargo-Hook Suspension System

Other equipment

The helicopter was fitted with a retractable mirror, but the pilot did not use it during the pre-start and take-off. The pilot stated that it was a passenger 'only' flight, and so he did not need to deploy the mirror.

There was no evidence of distortion or scratches on the sling's primary ring and secondary shackle. The long-line did not break or show any evidence of damage. It was made from dyneema[5], which has a slightly higher strength than a steel wire of the same dimension, but is less than one tenth of the weight. Dyneema has an excellent abrasion resistance compared with other synthetic fibres (five times better than polyester).

Figure 8: Sling shackle and primary ring

Figure 9: Sling line casing

[5] Dyneema - Ultra High Molecular Weight Polyethylene and one of the strongest fibres in the world

The Operator

The operator, Niugini Helicopters[6], operates principally out of Kimbe, West New Britain Province, with a fleet of seven Bell helicopters.

The Niugini Helicopters' operations at Kiunga were being conducted on a two-pilot rotational basis primarily in support of Digicel PNG. The Operator had an agreement with Digicel PNG to provide invoices monthly for providing ad-hoc transportation for a technicians from R&A Marine Services, and equipment to Digicel's tower stations around the Western province.

The operator stated that they did not require a loadmaster at Kiunga, because it was not a base of operation, and CAR 136.331 would apply only if Kiunga was a base identifiable under their exposition.

> CAR 136.331(a) states:
>
> (a) A holder of an air operator certificate must ensure that at every base where helicopter sling load operations are conducted, ground based operational activity is supervised and controlled by a loadmaster meeting the training requirements of rule 136.951 and the competency requirements of rule 136.955.
>
> CAR 119.75 (a) states:
>
> (a) An applicant for the grant of an air operator certificate must provide the Director with an exposition that contains the following—
>
> (5) a summary of the scope of activities at every location where the applicant's operational personnel are based for the purpose of providing air operations

The Niugini Helicopter's exposition did not provide the scope of activities for Kiunga; a location where their operational personnel were based for the purpose of providing air operations.

> CAR 119.111 Changes to certificate holder's organisation states:
>
> (a) A holder of an air operator certificate must —
>
> (1) ensure that the exposition is amended to reflect changes to the organisation and changes to the procedures for conducting air operations; and
>
> (2) provide the Director with a copy of every amendment to its exposition as soon as practicable after the amendment is incorporated into its exposition; and
>
> (b) Where the holder of an air operator certificate proposes to make a change to any of the following, prior notification to, and approval by the Director is required:
>
> (3) the scope of the air activities the certificate holder undertakes;
>
> (4) the locations from which the certificate holder conducts air operations;
>
> (c) Changes to any of the subjects listed in paragraph (b) must be approved by the Director through the issue of revised operations specifications issued in accordance with rule 119.13 prior to the effective date of changes to the exposition.

The operator's exposition did not contain amendments to include Kiunga as an operational location, and for sling operation activities. The operator's operational personnel were based in Kiunga full time, and the flights conducted included sling operations.

[6] Niugini Helicopters - The trading name for Ballina Limited

Regulator

The Civil Aviation Safety Authority of Papua New Guinea (CASA PNG) is tasked with regulatory oversight of Safety Civil Aviation System. CASA had conducted routine audits on the operator during their operations out of Kiunga, but did not advise the operator that it had to have Kiunga listed as an operational location, and sling operations reflected in their exposition, to be approved by the Director7.

AIC comments

The Operator did not have any qualified person tasked to carry out the duties of a loadmaster for any of the sling operations out of Kiunga. They had been relying on the pilots to carry out all the duties.

The operator did not include in its exposition, Kiunga as a place of operational activity, nor did it include sling operations as a type of activity, although operational staff were based in Kiunga, full time, for helicopter operations, particularly sling operations. The AIC notes Section 2.2.2 of the Exposition is silent regarding sling operations, which form a major part of the Kiunga operations. Sling operations appear to be in the "not restricted to" category of the Section 2.2.2.

The three 200 L drums filled with diesel had a gross weight of about 579kg. The investigation calculated that the force required to lift that weight at an angle of 45° off its correct perpendicular line position, would be approximately 8,188 N (kg.m/s2). The pilot stated that the helicopter had reached a speed between 35 and 40 kts when the helicopter abruptly stopped forward flight.

The drums were launched into the air and travelled about 45 m horizontally. The force exerted on the drums at 45° (lift angle) was approximately five times the force required to lift them.

There is no evidence to suggest that the long line was hooked onto the belly hook of the helicopter. There was no damage or any sign of the line being attached to the belly hook.

CAR 136.5 states:

> A holder of an Air Operator Certificate must take reasonable care to ensure that all persons employed, engaged, or contracted by the holder of an air operator certificate to perform aviation activities, are familiar with the appropriate sections of the Act, Civil Aviation Rules, and procedures specified in the certificate holder's exposition.

It was also apparent that there was a language barrier between the pilot and the local contractor who assisted heavily in the ground operations.

The investigation determined that the sling was not attached to the belly hook of the helicopter. It draped over the left step, above the left landing gear skid of the helicopter. It is likely that in throwing the line under the helicopter, the shackle draped over the step and skid from under the helicopter. During the take off and forward flight, the sling played out to its full length and became taut when the shackle snagged on the step, abruptly arresting the forward movement of the helicopter, and dragging it down onto its left side in uncontrolled flight. The step subsequently fractured as a result of the applied load. As the helicopter was dragged down, recovery from the uncontrolled flight was not possible from such a low height.

[7] The Director of Civil Aviation under the Civil Aviation Act 2000 (as amended)

Safety action

Safety action taken by Niugini Helicopters.

On 18 March 2017 Niugini Helicopters sent the AIC a copy of a document titled:

> STANDARD OPERATING PROCEDURES FOR DIGICEL ─ KIUNGA OPERATIONS AS AT 15 MARCH 2017 CASA Approved) (being subject to 12 monthly review by NGH Snr Mgmt).
>
> The procedures specify that:
>
> > Kiunga NGH Pilots shall *select, train and maintain a Loadmaster at Kiunga*, who is *capable of providing* supervision and loading of sling cargo, checking of sling equipment, maintaining awareness of dangerous goods and the marshalling of passengers around the helicopter, as well as associated supporting work, including refueling.
>
> The procedures include a requirement for the Kiunga NGH Pilot to conduct Loadmaster / Ground Crew refresher Training in the above aspects of the Kiunga operation, passenger briefings, and conducting 360deg Walk-Arounds of the helicopter. No passengers are to be carried during sling-load operations. A loadmaster will be carried, where the safety of a Digicel (or any other) landing pad is unknown or at risk.

Safety action taken by the Civil Aviation Safety Authority of PNG

On 21 March 2017, the Civil Aviation Safety Authority of PNG issued a *Safety Notice for all RW Air Operators, SNFO RW 001/17*, with the subject helicopter Sling Load Operations.

> The SNFO states:
>
> > CASA PNG advise that no persons other than approved, qualified and certified load master be carried on board a helicopter during sling load operations.
> >
> > All helicopter Operators must safely plan and conduct all sling load operations in accordance with CAR 136 Sub part "H" and comply with CAR Part 92, all requirements of IATA Dangerous Goods Regulations published in the 58th Edition, when carrying dangerous Goods either internally and on Sling load operations.
> >
> > CASA Action required: Operators must advise all their Pilots, Load Masters and their Clients to comply to this safety notice RW001/17 for any sling load operations.
> >
> > Implementation Date: 21st March 2017.
>
> On 24 March 2017, CASA PNG issued a *Safety Alert Bulletin, Number 02/2017*, titled *Helicopter Stabilized Hover Checks Before Departure*. The Objective states:
>
> > This *Safety Alert Bulletin* (SAB) serves to alert personnel to the importance of using Checklists and specifically performing Hover checks before departures.
>
> On 13 April 2017, CASA PNG issued a *Safety Alert Bulletin, Number 03/2017*, titled *Cargo Hooks Systems ─ Inspection and maintenance Requirements.*
>
> While not relevant to the circumstances of this accident, the PNG Accident Investigation Commission draws the importance of this safety information to the attention of PNG helicopter operators and maintainers.

General Details

Date and time	15 February 2017 – 05:00 UTC approximately	
Occurrence category	Accident	
Primary occurrence type	Impacted aerodrome apron during takeoff	
Location	Kiunga Aerodrome, Western Province	
	Latitude: 6° 7'32.82"S	Longitude: 141°17'6.67"E

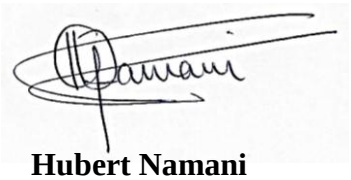
Crew details

Nationality	New Zealand
Licence type	CPL (H)
Licence number	P20495
Total hours	5,800.0 hours
Total hours on type	644.0 hours
Total hours last 30 days	13.9 hours

Aircraft Details

Aircraft manufacturer and model	Bell Helicopters Model 407	
Registration	P2-HSE	
Serial number	53257	
TTIS	4,193.3hrs	
Engine		
Engine manufacturer and model	Rolls Royce Corporation 250-C47B	
Engine serial number	CAE-847280	
Type of operation	Charter	
Persons on board	Crew: 1	Passengers: 2
Injuries	Crew: 1 (minor)	Passengers: 2 (minor)
Damage	Destroyed	

Approved



Hubert Namani

Chief Commissioner

11 August 2017