FINAL REPORT

AIC 14-2519

PAPUA NEW GUINEA

ACCIDENT INVESTIGATION COMMISSION

SHORT SUMMARY REPORT

Island Hoppers Limited

P2-IHP

Agusta Bell B212

Engine failure

Hambuke Village, East Sepik Province

PAPUA NEW GUINEA

30 May 2014

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.

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.)

However, it is recognised that 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, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.

Engine failure involving an Agusta Bell B212 helicopter, P2-IHP

Occurrence details

On 30 May 2014, a Agusta Bell B212 helicopter, registered P2-IHP, owned and operated by Island Hoppers Limited was being operated on a commercial flight to transport government officials to the Drekikir and Yangoru areas. There were 14 persons on board; one pilot and 13 passengers.

Figure 1: Map of the area of the flight

After departing Wewak at around 0130 UTC[1], the helicopter climbed to an altitude of 2,800 ft. About 15 minutes after takeoff, the pilot noticed decreasing oil pressure on the left engine. He decided to continue the flight while monitoring the oil pressure gauge to determine if it was an actual oil pressure reduction or an instrument indication problem. Shortly after, with secondary indications of increasing engine temperature and torque the pilot decided to discontinue the flight and return to Wewak.

The engine oil pressure continued to show erratic readings and the Gas Producer Turbine (NG) temperature continued to increase followed by a sound the pilot described as similar to a compressor stall or surge. He decided to land as soon as practical and elected to go to Yangoru which was about 5 min away.

[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.

The engine indications continued to deteriorate on the left engine. Shortly after, the engine oil pressure rapidly decreased to zero, the engine became unmanageable and then failed. The engine RPM (Revolution per Minute) decreased to ground idle and was not producing power. The engine chip light illuminated on the master caution panel.

The pilot decided not to continue to Yangoru and land as soon as possible. He flew a single engine approach for a run on landing at the Hambuke Village Community School grounds.

The school ground surface was wet and muddy causing the helicopter skids to sink rather than skid along the surface on landing and with the thirteen passengers on board and the single engine approach. The landing was heavy causing significant stress/pressure on the skids.

Witnesses from the village also reported that during the landing approach they saw thick black smoke emitting from the helicopter exhaust.

After the heavy landing all thirteen passengers evacuated the helicopter to a safe distance away and were rescued by another helicopter to continue their journey as planned. None of the occupants were injured.

Figure 2: Heavy landing imprint made by landing gear skids

Early in the investigation it was thought that the landing gear skids may have been damaged with the rear skids yielding caused by the heavy landing. Engineering inspections at the accident site in accordance with the *Airworthiness Limitations Manual (1. Hard Landing page 6-1*), with measurements taken with weight "ON" and "OFF", revealed that there was no damage and the measurements were within the recommended manufacturers' specifications. However, a subsequent inspection after the helicopter had been flown to a maintenance facility revealed cracks on the landing gear mount surface, and worn bushes and rubber damper on the skid to fuselage mount points.

The combining[2] gear box and left engine gear box chip detectors was removed and inspected and found to be contaminated with metal particles attached to the magnetic points. This caused the chip light on the caution panel to illuminate. The right engine gearbox chip detectors were removed and inspected. No metal particles were observed and the right engine gear box chip detectors were determined to be serviceable.

[2] The engine configuration consists of two PT6T-3B power sections coupled to a combining gearbox with a clutch system enabling both twin and single engine operation.

Weight and balance

The investigation determined that aircraft was loaded within the permissible weight and balance limits, according to the approved Aircraft Flight Manual (AFM).

Engine examination

The engines and combining gearbox were sent to Pratt and Whitney Canada for disassembly and investigation under the supervision of the Transportation Safety Board of Canada.

> The manufacturer concluded that the engine No. 1 power section lost useful power due to the disintegration of the combining gearbox left hand 1st stage gear input shaft roller bearing (No. 6 Bearing), which allowed radial movement and vibration of the left hand 1st stage gear and disengagement with its mating idler gear. This unloaded the No. 1 Power section power turbine drive train, allowing the power turbine to accelerate to an overspeed condition and release the power turbine blades, with resultant damage to the adjacent and drive train components. One No. 6 bearing outer race retaining bolt locking key washer was not in place, which resulted in loosening of the bolt with subsequent vibration and eccentric loading leading to fracture of the inner race and liberation of the rolling elements. The No. 6 bearing is accessed only at overhaul or major repair. The facility conducting the last overhaul of the combining gearbox could not be determined from records forwarded with the engine.

Figure 3: No 6 bearing outer race Photograph courtesy of Pratt and Whitney Canada

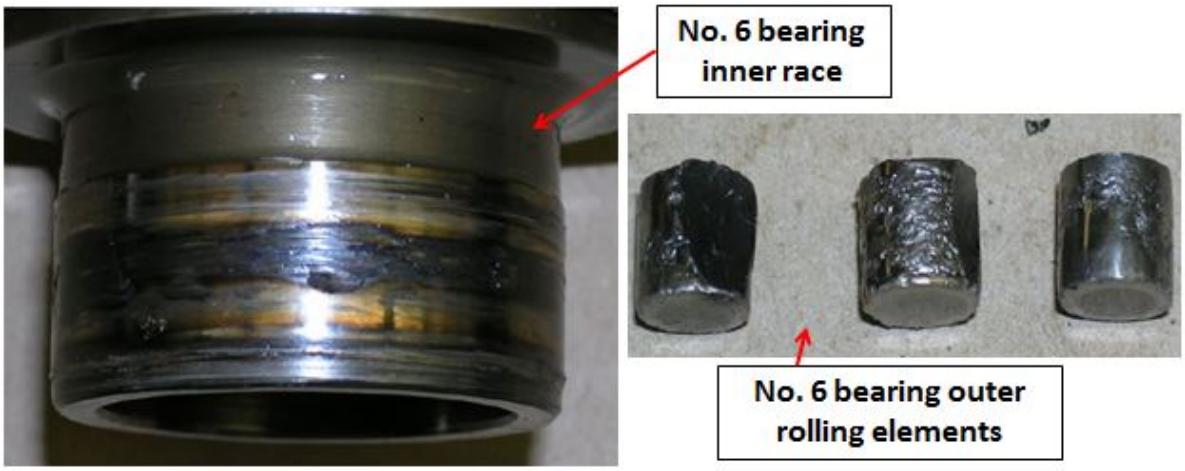


Figure 4: No 6 Bearing race and rolling bearings Photograph courtesy of Pratt and Whitney Canada

Figure 4: No. 6 bearing showing failed components Photograph courtesy of Pratt and Whitney Canada

AIC comment

The engine logbooks did not contain details of the last engine overhaul, nor did they contain details of the last overhaul of the combining gearbox. Many maintenance records were found to be incomplete and some records required under PNG Civil Aviation Rules were non-existent.

The operator no longer has an aviation company in PNG.

The AIC accepts the Pratt and Whitney Canada finding that the engine No. 1 power section lost useful power due to the disintegration of the combining gearbox left hand first stage gear input shaft roller bearing (No. 6 Bearing), which allowed radial movement and vibration of the left hand first stage gear and disengagement with its mating idler gear.

General details

Date and time:	30 May 2014 approximately 0155 UTC	
Occurrence category:	Serious incident	
Primary occurrence type:	Engine failure	
Location:	Hambuke Village, East Sepik Province, Papua New Guinea	
	Latitude: 03°40' S	Longitude: 143° 20' E

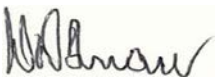
Crew details

Nationality	New Zealand
Licence type	Commercial (PNG)
Licence number	P21817
Total hours	11,136 hours
Total hours on type	913 hours

Aircraft details

Helicopter manufacturer and model	Augusta Bell 212	
Registration:	P2-IHP	
Serial number:	5522	
Engine number one (left)		
Engine manufacturer and model	Pratt and Whitney Canada PT6T-3B	
Engine serial number	CP-PS 62374	
	Time since new: 16,151.9 hours	Time since overhaul: 1771.0 hours
Engine number two (right)		
Engine manufacturer and model	Pratt and Whitney Canada PT6T-3B	
Engine serial number	CP-PS 60308	
	Time since new: 2,731.1 hours	Time since overhaul: 1771.0 hours
Combining gearbox		
Serial number	CPGB-1158	
	Time since new 2,731.1	
Type of operation:	Charter	
Persons on board:	Crew: 1	Passengers: 13
Injuries:	Crew: 1 Nil	Passengers: 13 Nil
Damage	Nil impact damage	

Approved



David Inau
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Accident Investigation Commission