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AIR ACCIDENT INVESTIGATION BRANCH

**AIB BULLETIN
ACCIDENT**

AIB No: ACC/6-22	Ref: CAV/ACC/6/22	Category: 1.1
Aircraft Type & Reg.:	Reg: 5H-PWF	Serial No. MSN 819
No. and type of Engines:	Two PW 127M	
Year of Manufacture:	2010	
Date and Time (UTC):	6 November 2022 at 0545 hours; (0845 hours local time)	
Location:	Bukoba airport, Tanzania	
	Lat. S 01° 20.1' Long. 031° 49.16' Elevation 3,740 feet	
Type of Flight:	Scheduled commercial flight	
Persons on Board:	Crew – 4	Passengers – 39
Injuries:	Crew – 2 Fatal	Passengers – 17 Fatal
Nature of Damage:	Aircraft written off	
Commander's Licence:	ATPL	
Commander's Age:	64 years	
Commander's Experience:	23,515 hours of which 11,929 hours were on the type	
	Last 90 days: 181 hours	
Name of Operator:	Last 28 days: 29 hours	
	Precision Air	
Information Source:	Telephone call from CATM - TCAA	

ALL TIMES UTC

UTC + 3 = Local Time

The Bulletin contains facts relating to the accident which have been determined up to the time of issue. This information is published to inform the public and the aviation industry of the general circumstance of the accident at the preliminary/stage and must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

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SUMMARY

The aircraft took off from Dar es Salaam at 0310 hours UTC (0610 hours Local Time) and the estimated time of arrival at Bukoba was 0525 hours (0825 hours Local Time). It was carrying 39 passengers and a crew of four. The enroute weather was reported to be fine and the flight to Bukoba was uneventful.

The weather at Bukoba was good up to 0520 hours (0820 hours Local Time) when it abruptly changed and started raining with thunderstorms and strong winds. The reported visibility reduced from 10 km to 2 km. 5H-PWF reached Bukoba at 0525 hours (0825 hours Local Time) to find that the weather had changed several minutes earlier. There were thunderstorms, Cumulonimbus (CBs) clouds and strong winds. According to eye witnesses, the aircraft circled twice in the Bukoba area and the crew advised the passengers that the flight may have to divert to Mwanza if the weather at Bukoba did not improve. However, on the third attempt, the runway became visible and the pilot initiated approach to runway 31. Some of the surviving passengers testified that the approach was normal until shortly before touchdown when the aircraft shook violently and nosed down while banking to the left. A loud bang was heard and a large quantity of water almost filled the entire cabin. The rear flight attendant succeeded in unlatching the rear passenger door and, with the help of a passenger, they opened the door. This passenger was later to stand on the doorway and extricated most of the survivors from the wreckage into the fishermen's canoes. The aircraft was extensively damaged by the impact and the subsequent rescue operation.

History of the flight

The aircraft was operating Precision Air Flight PW 494 from Dar es Salaam to Bukoba, the subsequent destinations being Mwanza and Dar es Salaam. It was carrying 43 persons including 39 passengers, two pilots and two cabin crew members. One of the passengers was an infant.

The aircraft took off from Dar es Salaam at 0310 hours (0610 hours Local Time) and the estimated time of arrival at Bukoba was 0525 hours (0825 hours Local Time). The weather at Bukoba was good up to 0525 hours (0820 hours Local Time) when it abruptly changed and started raining with thunderstorms, CBs, strong winds and fog. The reported visibility was reduced from 10 km to 2 km.

The aircraft was observed to circle around areas in Bukoba, Missenyi and Muleba Districts. It was later observed to make a normal approach to runway 31 (from the Lake) but it struck the Lake surface shortly before reaching the threshold. It came to rest about 500 meters short of the runway.

Rescue boats and canoes extricated some of the occupants from the wreckage but 19 were found dead. The two pilots were among those who died. All the two cabin crew members survived the accident without serious injuries.

Injuries to persons

None of the 22 surviving passengers and two cabin crew members suffered serious injuries. However, the injuries to 17 passengers and the two pilots were fatal.

Damage to the aircraft

The aircraft was substantially damaged by the impact with water and was further damaged during the subsequent rescue and recovery operations. It is considered to be a probable write-off.

Examination of the wreckage

The aircraft came to rest in water (Lake Victoria) some 500 meters from the threshold of runway 31. The depth of water at this point was 5.4 meters. It was inclined at a shallow angle with much of the front section of the fuselage completely immersed in water. Only the aft section of the fuselage and the tail plane were clear of the water. The rear passenger door on the left side of the fuselage was partially submerged in water. This made it very difficult to open from inside.

The damage to the aircraft was consistent with high energy impact with water. Much of the impact loads appear to have been taken by the left wing, the left propeller, the left main and the nose landing gears. These two landing gears separated in the accident sequence. The left main landing gear separation also took away a section of the floor measuring nearly four-square meters. The radome also separated on impact. It would look therefore that the aircraft did not ditch in a wings-level attitude. It should have been banked to the left and pitched nose down at the time of impact. This is also supported by the fact that the aircraft rotated about the left wing tip and came to rest facing in the direction which was almost opposite to direction of the flight.

The damages to the right wing and the right propeller were relatively minor. The right main landing gear remained attached and sustained relatively little damage.

The weather

The reported weather at Bukoba was good up to 0520 hours (0820 hours Local Time) when it abruptly changed and it started raining with thunderstorms, CBs and strong winds. The reported visibility reduced from 10km to 2km. 5H-PWF reached Bukoba at 0525 hours (0825 hours Local Time) to find that the weather had already changed.

The aircraft circled around for about 20 minutes hoping that weather would eventually improve. When the pilot decided to initiate the approach to runway 31 (from the lake) visibility had already improved according to some surviving passengers. They said they could see the runway and the markings at the threshold before ditching in the lake. Eye witnesses who were at Bukoba airport at the material time also said they could see the Musila Island which is 2.9 km beyond the threshold of runway 31.

Bukoba airport

Bukoba airport elevation 3,740 feet has a single runway 13/31 which is 1500 meters long and 30 meters wide. The surface is tarmac and was in good condition at the time of the accident.

There is a fire station at Bukoba which is equipped by one fire engine and manned by 10 Fire men who provide rescue operations on land occurrences. They are not equipped for offshore operations.

Water rescue operations for Bukoba is covered by the Police Marine unit at the nearby Bukoba port. This unit also conducts Marine Patrols in the Lake Victoria and is equipped with one 400 hp motor boat. The Marine Unit reported that they were notified 15 minutes after the occurrence took place. At that moment the rescue boat was not in the harbour at Bukoba. It was away on patrol duties. The boat arrived at the scene at around 1049 hours (1349 hours Local Time) however divers were unable to perform their duties for lack of oxygen in the bottles.

There is no Control Tower at Bukoba airport. All aircraft operating into the airport use the services of the Mwanza Approach on frequency 122.8MHz until they report Bukoba insight. Subsequently the flight crew switch from the said frequency to **118.2 MHz** which is the unmanned frequency for approach and landing at Bukoba.

Survival aspects

Examination of the wreckage with two landing gears separated indicates that it was a high energy impact. Indeed the left main landing gear impact dislodged the floor in the passenger cabin, allowing water into the cabin at high pressure as the aircraft decelerated before coming to a stop.

Many occupants on the front and middle seats who could not unbuckle themselves immediately were engulfed in water and may have suffocated by drowning. The front section of the fuselage was completely immersed in water after the aircraft came to rest while the rear section remained partially immersed in water. Some passengers managed to stand on the seats and walked rearwards.

It was the rear cabin crew member who unlocked the left passenger door. She was helped by a muscular passenger to push the door into the open position. It has been established from various interviews that it is this very passenger who held the door into the open position and managed to extricate most of the passengers from the wreckage. These surviving passengers including a child of 18 months as well as its mother were also saved in this way. Canoes and fishermen arrived after about 5 minutes and they transferred the survivors to their boats. 24 survivors including the two cabin crew were saved.

The official rescue 400 hp Marine boat belonging to the Police Marine Unit arrived at 1049 hours (1349 hours Local Time). The reason for this was that it was not at the Bukoba harbor and the occurrence was notified to the Marine Police at 0600 hours (0900 hours Local Time). It was on patrol duties outside Bukoba port.

However, the marines who arrived late at the scene could not conduct successful the required underwater rescue operations due to lack of oxygen and sufficient fuel on the boat. Most of the bodies were removed from the wreckage by Marines Unit.

Before the arrival of Police Marine Unit one of the local fishermen started the process of recovering of the dead bodies from the wreckage.

Discussion

The aircraft was in a landing configuration with the landing gear down and flaps set at 35 degrees as it was observed to execute a final approach to runway 31 of Bukoba airport. It then suddenly shook violently and nosedived into the lake, coming to rest in water before reaching the threshold of the runway.

In the circumstances, this would indicate that whatever happened was sudden and catastrophic. Physical examination of the wreckage showed that 5H-PWF was banked to the left and in a nose down attitude when it struck the water surface. The damage to both propellers indicated that it was under power at the time of impact.

It looks like there was no attempt to ditch the aircraft in the Lake (*Landing on water*) due to the fact that the aircraft was already configured to land on runway 31. Additionally, the passengers were not instructed to put off their shoes and wear life jackets for an emergency landing in water.

The Bukoba MET office reported that there was good weather at Bukoba until 0520 hours (0820 hours Local time). When Flight 494 reached Bukoba five minutes later, the weather had completely changed. There was rain with thick CBs, thunderstorms, lightning, fog and strong winds. Given this type of weather at Bukoba airport, the pilot should have chosen to divert to Mwanza or to circle around until the weather condition improved.

It had been proved from the surviving accident passengers and cabin crew that when the landing was attempted at around 0543 hours (0843 hours Local Time) the weather condition at Bukoba had improved and the runway was visible. However, it was still raining and some CBs were still visible and the storms were less violent.

For pilots operating into Bukoba airport, storms over Lake Victoria are well known and can cover an area of about 100 square kilometers. They can also be extremely violent. The pilot in command was a very experienced pilot. He had flown a lot in the Lake Victoria Region and Bukoba was his native district.

The approach to Bukoba airport can be tricky in adverse weather conditions. There is Musila Island with a tall cliff lying 2.9 km beyond the threshold of runway 31. There are also tall hills, rising to 560 feet in the approach path of runway 13. Added to these obstacles, there is a weather problem. During rainy season at Bukoba it is usual to experience abrupt changes in weather conditions, sometimes lasting 15 to 20 minutes or so, which create severe turbulence above the Lake surface especially near the shores.

At this stage of investigation, the possibility of wind shear (downdraft) cannot be ruled out due to the fact that the aircraft nosedived while dropping the left wing before striking the water surface.

The two pilots who were in the cockpit appear to have been unable to open the cockpit door and overhead escape hatch because of high water pressure. If there could have been immediate rescue operations, it is most likely that more people would have survived.

Safety recommendations

It is recommended that:

1. The Government should build adequate capability to its units (i.e. Airports Rescue and Fire Fighting Services and Marines Rescue Unit) for the implementation of Search and Rescue operation during occurrences. In addition, there should be a well-structured and effective coordinated aviation and marine search and rescue operation.
2. Air Operators flying into Bukoba should conduct risk assessments regularly for the safety of their operations

Investigation

Investigation to establish the cause of the accident is still ongoing.

The Tanzania AAIB investigations are conducted in accordance with ICAO Annex 13 to the Chicago Convention on International Civil Aviation and The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2017.

The sole objective of the investigation of an accident or incident under these Regulations is the prevention of future accidents and incidents. It is not the purpose of such an investigation to apportion blame or liability.

Accordingly, it is inappropriate that AAIB reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

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