Aviation Safety Investigation Report 199603607

Piper Aircraft Corp Chieftain

05 November 1996

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Aviation Safety Investigation Report

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Occurrence Number: 199603607 **Occurrence Type:** Accident
Location: 2km WNW Derby, Aerodrome
State: WA **Inv Category:** 4
Date: Tuesday 05 November 1996
Time: 1900 hours **Time Zone** WST
Highest Injury Level: Minor
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	0	0	1	0	1
Ground	0	0	0	0	0
Passenger	0	0	0	7	7
Total	**0**	**0**	**1**	**7**	**8**

Aircraft Manufacturer: Piper Aircraft Corp
Aircraft Model: PA-31-350
Aircraft Registration: VH-KLK **Serial Number:** 31-7405450
Type of Operation: Charter Passenger
Damage to Aircraft: Substantial
Departure Point: Derby WA
Departure Time: 1900 WST
Destination: Cadjebut WA

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Commercial	70.2	1343

Approved for Release: Tuesday, July 8, 1997

FACTUAL INFORMATION

The aircraft departed Broome on a short-notice charter to transport seven passengers from Derby to Cadjebut. The flight to Derby was uneventful and the passengers were boarded for the trip to Cadjebut. Apart from a small amount of surging from the right engine after start, the start, taxi and line up were normal. The pilot assessed the surging to be the result of low RPM after start and noted that the surging disappeared as RPM increased. He saw no discrepencies during the magneto checks on taxi.

No problems were encountered in the takeoff until about 150 ft above ground level, when the pilot assessed that the right engine had failed. The landing gear was already retracted and the pilot commenced emergency drills for an engine failure after takeoff. He stated that there was insufficient time to feather the propeller and that the aircraft did not climb. It eventually impacted the ground and slid to a stop over mud and through low mangrove bush.

The passengers and pilot evacuated the aircraft. After the pilot had notified Air Traffic Services that the aircraft had crashed, he made the aircraft safe, and he and the passengers walked to the airport.

An on-site inspection did not reveal any defects or circumstances which could have contributed to an engine power reduction or the subsequent landing on the mud flats. Impact marks on the ground from the propellers supported the contention that the right engine was not delivering the same power as the left engine. The strike marks indicated that the right engine RPM was approximately half that of the left engine at initial impact with the ground.

The right engine was transported to Perth where it was successfully ground-run on an engine rig. The engine was subsequently dismantled and extensive tests were performed on components which could have contributed to the perception by the pilot and several of the passengers that the engine had failed or had significantly reduced its power output. These tests centred mainly on the turbo-charging, electrics and the fuel systems. Anomolies were only discovered in the dual magneto. However, the anomolies could not be directly connected to the power reduction.

The reason for the power reduction thus remains undetermined.

The aircraft was at, or marginally over, the maximum weight for take off when the power reduction occurred. The density altitude when the pilot commenced his emergency drills was about 2,000 ft and the pilot had not been able to feather the right propeller before the aircraft impacted the ground. The pilot operating handbook performance data suggested that with the right propeller feathered, the aircraft may have been able to climb at a rate of about 180 ft/min under ideal circumstances. The handbook does not provide information on the effect of not having a feathered propeller on the inoperative engine.

Emergency locator transmitter

A NARCO ELT10 was fixed in the rear of the fuselage and was correctly armed. The ELT did not activate, probably due to low-impact forces on the mud flats. The beacon was not needed as the pilot made radio contact with a flight service officer and the crash was observed by another aircraft.

ANALYSIS

Studies have shown that the combination of high weight, high density altitude and added drag from an unfeathered propeller can all reduce the climb performance of a light twin-engined aircraft in the event of an engine failure. Results of some of these studies were publicised during the 1996/97 Civil Aviation Safety Authority Flight Forum Series and the results indicated that an unfeathered propeller could reduce the rate of climb on a representative PA 31 by between 100 and 200 ft/min. It therefore follows that this aircraft was unlikely to have been able to maintain a positive rate of climb if the engine completely failed.

Although it is not known to what extent the engine power was reduced, the propeller marks indicate an RPM reduction in the order of 50% from take-off RPM, which suggests a substantial loss of useful power and possibly a windmilling propeller. This, and the performance data above, would probably explain the inability of this aircraft to climb away.

[redacted]