Aviation Safety Investigation Report 199701627

Jabiru
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19 May 1997

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Aviation Safety Investigation Report

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Occurrence Number: 199701627 **Occurrence Type:** Accident
Location: Bullara Station, 56km S Learmonth, Aerodrome
State: WA **Inv Category:** 4
Date: Monday 19 May 1997
Time: 0930 hours **Time Zone** WST
Highest Injury Level: Serious
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	0	1	1	0	2
Ground	0	0	0	0	0
Passenger	0	0	0	0	0
Total	**0**	**1**	**1**	**0**	**2**

Aircraft Manufacturer: Jabiru
Aircraft Model: 1600A
Aircraft Registration: AUF 550945 **Serial Number:**
Type of Operation: Non-commercial Other (including military)
Damage to Aircraft: Substantial
Departure Point: Bullara Station WA
Departure Time: 1015 WST
Destination: Bullara Station WA

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Private	170.0	520

Approved for Release: Friday, August 8, 1997

The flight was planned as a familiarisation flight for the passenger. The pilot did not detect any fault with the engine during the pre-flight inspection and he reported that the compression on all cylinders appeared normal. The aircraft was close to its maximum weight at takeoff.

During the take-off roll engine RPM was 2800. Maximum RPM permitted was 3300 however, the manufacturer reported that the engine/propeller combination fitted to the aircraft was only expected to produce between 2900 and 2950 RPM. Although the take-off performance appeared below normal, the pilot believed it was caused by the aircraft being close to its maximum weight. Witnesses reported that the aircraft used almost all of the 900 m strip for its take-off roll. The manufacturer reported that the take-off roll in a Jabiru 1600 at maximum weight should be between 250 and 300 m.

After becoming airborne the aircraft would not climb and engine RPM had fallen to 2700. The pilot turned to follow the road in case the engine lost more power. He completed trouble checks but was unable to identify the reason for the loss of performance. Shortly after, the engine regained some power and the pilot decided to attempt a return to the airstrip.

During the subsequent turn the engine stopped completely. The pilot then attempted a forced landing in a tree covered area. Whilst attempting to avoid a medium sized tree, at a height of approximately 20 ft above the ground, one wing collided with the tree and the aircraft stalled and crashed. The fuselage turned through 180 degrees and slid backwards into another tree before coming to a stop.

Although the aircraft was extensively damaged the cockpit area was relatively intact. A fuel filter had fractured allowing fuel into the cockpit however, there was no fire. The pilot turned the fuel off and secured the electrical system before he and the passenger exited the wreckage.

An inspection of the engine disclosed that the exhaust valve, seat and spring on the No. 3 cylinder had been subjected to excessive heating. The valve guide was loose in the cylinder head and the valve spring had lost its tension. There was an accumulation of grease and metal shavings in the rocker cover which had been there for sufficient time to congeal indicating that the valve, seat and spring had been in this condition for some time. The faults meant that the valve might or might not seat correctly during engine operation. The variable nature of the valve operation could lead to an intermittent power loss at those times when the valve was not seated correctly. It is possible that the valve was seated correctly when the pilot checked the compression during the pre-flight inspection; however, the post-accident investigation was unable to reproduce normal cylinder compression. It is possible that the low RPM and excessive take-off distance, reported by the pilot, was a symptom of the valve problem.

The engine was fitted with a reconditioned cylinder head and the manufacturer reported that there had been other cases of valve guides coming loose. To manage this type of problem the manufacturer had included a compression check and, if this proved irregular, a tappet check in the daily inspection requirements. Although the precise reason for the valve guide failure could not be determined the guide is held in place by a using a temperature-dependent shrink-fit. As there was an indication of excessive heating, it is possible this caused the fit to come loose.

Although the valve position could lead to a loss of power, experience indicates it would not normally be sufficient to stop the engine. It could not be determined why the engine stopped. The manufacturer reported that any reduction in power, during three cylinder operation, might stop the engine. The pilot reported that he did not reduce power.

At the low speeds, normally used during a forced landing, any abrupt manoeuvres made to avoid trees would probably cause the aircraft to stall.

SAFETY ACTION

The manufacturer has discontinued production of the 1600 cc engine and replaced it with a 2200 cc engine which is manufactured using a different process. This will alleviate the problem with the valve guides.

The manufacturer is also working to relocate the fuel filter to prevent fuel from entering the cockpit in the event of a failure.

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