

**Aviation Safety Investigation Report
199503340**

**Cessna Aircraft Company
C340**

09 October 1995

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Occurrence Number: 199503340 **Occurrence Type:** Accident
Location: 1.5km SSW Parafield, Aerodrome
State: SA **Inv Category:** 3
Date: Monday 09 October 1995
Time: 1608 hours **Time Zone** CST
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	1	0	1
Total	0	0	2	0	2

Aircraft Manufacturer: Cessna Aircraft Company
Aircraft Model: 340A
Aircraft Registration: VH-EOS **Serial Number:** 340A0291
Type of Operation: Miscellaneous Experimentation
Damage to Aircraft: Substantial
Departure Point: Parafield SA
Departure Time: 1600 CST
Destination: Parafield SA

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL	11.0	1848

Approved for Release: Monday, March 10, 1997

FACTUAL INFORMATION

A short local test flight was planned to verify scientific equipment installed in the aircraft before it embarked on an atmospheric research flight.

The take off was normal from runway 03, and after climbing through 500 ft the pilot reduced the manifold pressure and RPM settings of both engines from take-off to climb power. Sometime after this he turned the auxiliary fuel pump switches from low to off. At 1,500 ft a vibration, which appeared to have originated in the left wing, was noticed by both the pilot and the data systems operator, who also held a private pilot licence endorsed on the aircraft type. They said that the left tip tank seemed to move through 10 - 15 mm, and the equipment pod, mounted on the underside of the left wing moved in the same plane and frequency. The right alternator warning light then illuminated.

Both pilots decided that it would be more prudent to return than continue the flight. The data systems operator suggested that because of the vibration a slow airspeed should be maintained during the descent. The pilot noticed that the airspeed indication was 115 kts, and believed he carried out the descent without any change to the power settings. He notified the control tower of his intention to return, but without advising the actual reason.

Approaching base leg for runway 03 the pilot reported that he selected 10 - 15 degrees of flap, and that the data systems operator extended the landing gear without consulting him. The data systems operator stated that it was after the aircraft had turned onto final approach he noticed the landing gear selector lever was between the retract and extend positions, and moved it to the extend position. He also attracted the pilot's attention to the airspeed, which had dropped to 82 kts, this being only several knots above the stall speed for the aircraft in its present configuration. The pilot advanced both throttles to reduce the high sink rate which had developed due to the slow forward speed, but neither engine appeared to respond. The throttles, pitch levers and mixture controls were then fully advanced, but still without any apparent response from either engines.

The pilot then realised it would be impossible to land the aircraft on the aerodrome, and a forced landing was inevitable. He thought he noticed the data systems operator selecting the flaps up at about this time, although the data systems operator could not recall doing this. As the data systems operator had more flying experience on the aircraft, and also being a glider pilot familiar with outlandings, the pilot considered him better qualified to carry out the forced landing, so gave him control. The data systems operator then had just enough time to ensure that the wings were level and initiate a flare, which failed to arrest the high rate of descent.

The aircraft impacted the ground heavily on a golf course adjacent to the runway threshold. Both main gear legs failed and separated, the nose gear leg remaining in situ still extended. The aircraft continued along a fairway for 230 m in a direction of 023 degrees, colliding with an automatic sprinkler system control unit, which buried deep into the left wing root area. The aircraft then struck two small trees. This turned the aircraft to the right before it came to a stop on a heading of 090 degrees. The pilot and data systems operator sustained minor injuries.

The landing gear was found to be extended, with its selector in the corresponding down position, and the flaps retracted with its selector in the up position.

Ground slash marks, and damage to all propeller blades indicated that the engines were operating at impact. The right propeller had all blades bent back, one blade severely bent, with lesser bending on the other two, indicating that each blade had contacted the ground before the engine stopped. Two of the blades also had forward bending tendencies, but marks on the blades indicated they had been buried in the ground when stationary, and this bending occurred as a result of the aircraft turning at the end of the ground run. All blades on the left propeller were bent back in a gradual curve, the bending again corresponding with each blade contacting the ground before the engine stopped.

Witnesses who observed the aircraft on its final approach reported hearing engine noise. Black smoke was also noticed coming from the right engine, and several backfiring sounds were heard.

After the accident, when the pilot was securing the cockpit and turning off electric power, switches and fuel, he noticed that an auxiliary fuel pump switch was in the high position. He could not recall this pump being turned on at any time during the flight. An inspection revealed that the right engine exhaust pipes had deposits of soot, but none at the outlet or along the underside of the nacelle. There was no soot in the left engine exhaust pipes.

All fuel filters were found to be clear of contamination, there were no obstructions in the fuel lines from the tanks to engines, and normal quantities of fuel were found at the engines in the fuel control units and distributor valves. Laboratory testing found no problems with the fuel.

No faults were found with the ignition systems which may have caused both engines to fail.

All external pods and probes were correctly attached, and no damage or defects could be found which may have contributed to the reported inflight vibration.

Both engines were inspected and no defects found which could have affected their operation. They were then installed in an engine test stand and ran normally at all power settings, responding correctly to all throttle movements.

The aircraft had been operated in the private category. The flight manual states that pilots required to operate the aircraft must be trained, and approved to fly this particular aircraft when configured for atmospheric research with external pods, pylons and probes fitted. The pilot had undergone several hours of familiarisation training 12 months previously, but had not flown the aircraft since. The operator did not conduct recency checks, or give continuation training for pilots

ANALYSIS

An inspection of the aircraft and its ancillary pods, pylons and probes failed to find any looseness, faults or any other airframe problems which may have caused the inflight vibration. It is possible that slight turbulence may have produced the effect. Illumination of the right alternator light was not considered as having contributed to the accident.

Both engines were found to be serviceable and capable of delivering full power. The propeller slash marks in the ground and damage suffered by the propeller blades before the engines stopped indicated that they were developing power at impact.

It is possible that the right auxiliary fuel pump was accidentally turned on as the pilot turned the pump switches from low to off during the climb. This would have produced a rich mixture in the right engine with associated rough running and vibration. It would also account for the deposits of soot in the right engine exhaust pipes, and the smoke seen by the witness.

While returning to the aerodrome the pilot stated that he did not adjust the engine power settings for the descent to circuit height. Due to possible task saturation he probably reduced the power without realising it, otherwise, with its engines operating normally, the aircraft would have accelerated. During this time however, the airspeed deteriorated from 115 kts to 82 kts.

The pilot selected 15 degrees of flap on base leg, and then after turning final was warned of the slow airspeed by the data systems operator, who had extended the landing gear, causing more drag. The aircraft would have been near its stall speed, with a subsequent high rate of descent. This would have been exacerbated if the data systems operator had raised the flaps, which he could not recall doing.

When the pilot opened the throttles he may have gained the impression that the engines were not developing power as the aircraft would have continued its rapid descent. With all the unusual activity going on it is possible that the pilot failed to register an increase in engine noise. The application of power probably prevented a stall developing, with subsequent loss of control.

There was no evidence found to indicate that both engines had suffered failures simultaneously, and were not capable of responding to throttle movement.

SIGNIFICANT FACTORS

1. A possible rich mixture on the right engine may have caused an inflight vibration.
2. The pilot and data systems operator became worried about a vibration, and did not monitor the aircraft's progress adequately.
3. The pilot was not current on the aircraft and allowed the airspeed to deteriorate with the aircraft developing a high rate of descent.