Aviation Safety Investigation Report 199501472

Cessna Aircraft Company Centurion

21 May 1995

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Aviation Safety Investigation Report

199501472

Occurrence Number: 199501472 **Occurrence Type:** Accident
Location: Toowoomba
State: QLD **Inv Category:** 3
Date: Sunday 21 May 1995
Time: 1410 hours **Time Zone** EST
Highest Injury Level: Fatal
Injuries:

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

Aircraft Manufacturer: Cessna Aircraft Company
Aircraft Model: 210M
Aircraft Registration: VH-SQU **Serial Number:** 21062930
Type of Operation: Non-commercial Business
Damage to Aircraft: Destroyed
Departure Point: Roma QLD
Departure Time: 1240 EST
Destination: Archerfield QLD

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Private	30.0	285

Approved for Release: Friday, May 10, 1996

1. FACTUAL INFORMATION

1.1 History of the flight

The pilot had planned to fly his own aircraft to Brisbane to attend an important business meeting. On the day of the flight a weather forecast was obtained by the pilot before his early morning departure from Longreach. The Area 40 forecast described a moist air mass which had engulfed south-eastern Queensland resulting in low stratus cloud, rain and fog over the eastern Darling Downs. A clearing change from the south-west was expected during the afternoon.

The aircraft was fitted with a GPS (Global Positioning System) which was unserviceable. Subsequently, the pilot borrowed a portable unit as an aid to navigation for this flight. He had planned to fly direct to Archerfield, the general aviation aerodrome for Brisbane. No flight plan was lodged with air traffic services for the VFR (visual flight rules) flight nor was there a need to do so.

In the Injune area the pilot noticed extensive cloud ahead along his chosen route and he decided to divert to Roma. During the subsequent descent the aircraft entered cloud at 9,000 ft and broke out at 7,000 ft. Following the landing the pilot was met by a local operator, who was a LAME (licenced aircraft maintenance engineer) and a pilot. The operator had extensive knowledge of operations in south-east Queensland. He was aware of the poor weather further east which he later confirmed by obtaining an actual weather observation from another pilot stationed at Toowoomba airport. Over coffee he advised the pilot to delay his departure until the next day as an early morning start would still enable him to meet his business commitment. However the pilot seemed inclined to continue with his original plan. He explained the importance of his business meeting in Brisbane, scheduled at 0900 the next day.

The pilot delayed his departure until 1240 leaving the local operator with the impression that he intended to follow the Warrego Highway to Brisbane. At about 1405 the aircraft which was partially obscured by cloud, was sighted by a LAME as it flew to the south of Toowoomba airport. The aircraft was next observed by several witnesses, some of whom were pilots, as it flew over Toowoomba City at 150-200 ft AGL (above ground level), under a cloud base of 400-500 ft. It appeared to be at cruise speed and the sound of the engine supported this observation. The aircraft was flying due east and was seen to enter a fog bank in the vicinity of the Toowoomba Grammar School and then bank slightly to the left as it disappeared from view.

Next, the aircraft broke minor branches off the top of a 15 m high tree located on the crest of the Toowoomba Range which was enveloped in thick fog. The aircraft was in a shallow descent when it struck the lower trunk of a large tree and crashed through the roof of a house 325 m beyond and below the ridgeline. The aircraft exploded on impact partially demolishing the house and setting it on fire. The pilot received fatal injuries. The two occupants of the house escaped through windows. Both were injured with one person requiring hospitalisation.

1.2 Personnel information

1.2.1 Pilot in Command

The pilot was aged 51 years and had commenced flying training in 1979. In 1983 he obtained a restricted private pilot licence which he upgraded to an unrestricted licence in 1990. Over the 15 year period he accumulated 285 hours flying experience, 30 of which were on the Cessna 210 aircraft type. His medical status for the licence was valid until 16 June 1996. His last medical examination report was annotated with the requirement to wear spectacles whilst flying.

During his stopover at Roma, he confided to the local operator that he still was uncomfortable flying his aircraft and that he was not fully knowledgeable about its operation. The local operator observed that the pilot looked fatigued. The pilot admitted that he had retired to bed at 0230 that morning and had arisen at 0530 to prepare for the flight to Archerfield. He also said that he felt fatigued especially after his experience of descending through cloud which had unnerved him. He said that he had little instrument flying experience and did not have an instrument rating.

1.2.2 Previous 72 hours history

The pilot owned a hotel and was involved in running the business. On the night before the flight he had had a maximum of three hours sleep. His previous recent history could not be established. The post mortem examination report indicated the presence of Paracetamol, a pain killer available without prescription.

1.3 Aircraft information

The aircraft was placed on the Australian Register on 8 January 1979. The present owner obtained the aircraft on 2 March 1995. The maintenance release was destroyed in the fire. A cursory inspection of the maintenance release by the LAME during its stopover at Roma indicated that the aircraft was due for a periodic maintenance inspection in 16 flight hours. Examination of the known flying activity of the aircraft reduced this period to 10 hours. There were no known outstanding maintenance defects.

1.4 Meteorological information

1.4.1 Introduction

The flight was to be operated under VFR from the departure aerodrome. The pilot was required to obtain the area forecasts (ARFORs) covering his route and the appropriate terminal area forecasts (TAFs). The pilot obtained ARFORs 40 and 41 but it is not known whether he obtained a TAF for his destination, Archerfield. ARFOR 40 covers a large area of south-east Queensland, including the eastern Darling Downs and the Brisbane area.

1.4.2 Area 40 forecast

The forecast valid from 0300 to 1800, gave an overview of scattered rain and showers clearing slowly from western parts after 0900. Forecast cloud consisted of broken stratus, base 700 ft, tops 3,000 ft, rain and showers. Also present was scattered cumulus, strato-cumulus, base 4,000 ft, tops 8,000 ft inland and alto-cumulus above 12,000 ft. The predicted visibility was 3,000 m in rain and showers.

The Archerfield TAF current from 0600 to 1800, forecast one OKTA (one-eighth cloud cover) stratus at 1,000 ft and 4 OKTA strato-cumulus at 2,500 ft with a deterioration to 5 OKTA stratus at 1,000 ft with visibility reduced to 4,000 m in rain. The Toowoomba TAF was similar with the cloud base 800 ft.

1.4.3 Weather conditions at Toowoomba

Actual weather observations by local pilots and other witnesses in the Toowoomba area indicated a cloud base sloping down to the east. The general cloud base at Toowoomba aerodrome was about 800 ft as forecast. It sloped to 400-500 ft over the city. A large fog bank enveloped the range area on the eastern boundary of the city until 1500 when the fog lifted to form low stratus. The Bureau of Meteorology observation at 1500 in the city reported complete cloud cover, rain with dry and wet bulb temperatures of 14 degrees Celcius.

1.5 Other information

1.5.1 A Safety Study of VFR Flight into Adverse Weather issued by the Transport Safety Board (TSB) of Canada published on 14 November 1990 found that:

- TSB data demonstrated a considerably higher accident rate for pilots with less than 400 flight hours.

-Business flying pilots were older than average (older than 40 years) and few held an instrument rating.

-They showed a tendency to fly in conditions which surpassed their personal ability or that of their aircraft.

-Visual restrictions in older pilots (50 years plus) lead to an increase in vertigo occurrences.

-Low time pilots had a strong tendency for poor in-flight decision making and often chose to fly into adverse weather.

-Occurrences showed inadequate planning, entering into flight operations beyond the pilot's ability and adopting improper procedures.

-Business pilots often made a conscious decision to continue flight despite the adverse weather conditions being encountered. Pressure to complete the flight was evident often from the pilot himself and this pressure took on a sufficiently high priority to jeopardise safety.

1.5.2 The Bureau's records show that on 1 May 1995 the pilot had been involved in conducting a VFR flight in IMC (instrument meteorology conditions) at Townsville. During descent to Townsville the pilot found himself in cloud and the services of the Townsville Approach Radar controller were required to vector the aircraft to a known clear area.

1.5.3. The visual flight rules state that the flight must be conducted in VMC (visual meteorological conditions). For flight outside controlled airspace and below 3,000 ft AMSL (above mean sea level), or 1,000 ft AGL (above ground level) which ever is the higher, the visibility must be 5,000 m or greater and the aircraft must remain clear of cloud.

2. ANALYSIS

2.1 Introduction

The investigation established that the aircraft was capable of normal operation at the time of impact. There was evidence to indicate that the performance of the pilot was affected by fatigue which may have adversely influenced his ability to carry out his task. Most of the aspects identified in the Canadian study of flight into adverse weather were present in this accident.

2.2 Examination of the aircraft

Information from witnesses who saw and heard the aircraft in the Toowoomba area said the engine sounded normal. Metallurgical examination of the exhaust manifold confirmed the engine was operating at the time of impact. Inspection of the aircraft wreckage and documentation did not reveal any significant discrepancies which could have contributed to the accident. The immediate explosion on impact and the intensity of the fire which followed indicated that the fuel tanks contained a substantial amount of fuel when the aircraft crashed.

2.3 The weather

Witnesses were unanimous in describing thick fog over the Toowoomba Range which did not lift until about an hour after the crash. This was a clear indication that VMC did not exist at the time of the accident.

2.4 Conduct of the flight

It is clear from the pilot's comments that he was inexperienced and underconfident in operating his aircraft. Prior to the accident he admitted feeling fatigued and a witness remarked that he looked fatigued. While the pilot may have admitted feeling fatigued, one of the most dangerous aspects of performance degradation with sleep loss, is that a person is unlikely to be aware of the manner and extent of their deteriorating performance (Hawkins, 1987). Fatigue can result in a number of significant decreases in performance such as poor self monitoring, increased susceptibility to distraction, lowered arousal and increased reaction time.

The pilot felt compelled to continue his flight to attend an important business meeting. He could have landed his aircraft at either Oakey or Toowoomba aerodromes and hired a vehicle to drive the remaining distance to Brisbane for his business meeting, which was not scheduled until 0900 the next day. One important aspect of acute fatigue is that the ability to make clear decisions is markedly reduced. Despite his previous encounter with cloud, the pilot continued the flight in non-VMC weather conditions.

2.5 The final flight path

The distance flown from entry into the fog bank to impact was approximately 850 m which would have been covered in about 10 to 12 seconds flying at a slow cruise. Considering the proximity of the terrain which the pilot must have been aware of, his anxiety and disorientation in the fog would have been significant. The aircraft's attitude at impact was nearly wings level and in a slight descent. This would suggest that the pilot maintained sufficient control to keep the aircraft nearly level from the time it entered fog to the point of impact. It is possible that the slight descent profile in the aircraft's attitude was a pilot control input in an attempt to regain visual contact with the ground.

3. CONCLUSIONS

3.1 Findings

1. The aircraft was serviceable and carried sufficient fuel for the intended flight.

2. The Area 40 Forecast indicated that a VFR flight to destination was unlikely to succeed.

3. Cloud in the Toowoomba Range area was at ground level.

4. The pilot did not have an instrument rating.

5. He was relatively inexperienced in total hours and on the aircraft type.

6. He was suffering from fatigue.

7. He seemed compelled to continue the flight to destination.

8. He had an important business meeting to attend in Brisbane the next morning.

9. He was flying under a low overcast when the aircraft entered fog.

3.2 Significant Factors

1. The pilot was suffering from fatigue.

2. The weather en route was not suitable for VFR flight.

3. The pilot had an important meeting to attend the following morning.

4. The pilot operated his aircraft in IMC. He was not rated for nor experienced in IMC operations.